SOUTHERN POWER AND INDUSTRY

Ad Index, page 116 JANUARY, 1952

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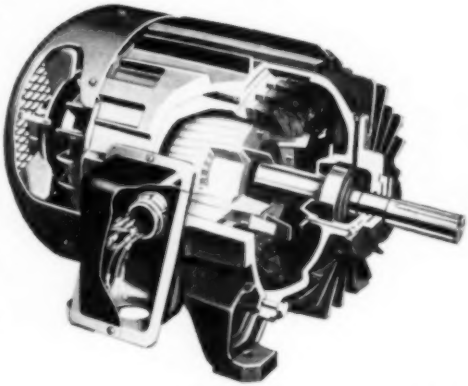
ALLIS-CHALMERS
Totally-Enclosed
Fan-Cooled
MOTORS

Look Outside

Greatly increased radiating area means greater cooling efficiency. More important, cooling efficiency stays high, regardless of operating conditions. There are no enclosed external air passages to clog and cause overheating. If oily dirt sticks, just wipe or blow it off. No matter how bad operating conditions are, this motor can be easily kept clean and cool running. Electrical parts are protected against corrosive atmospheres by cast iron yokes and end housings.

Look Inside



Double-shielded, heavy-duty ball bearings require no maintenance in ordinary service under most conditions. However, they can be lubricated without disassembly if required. Double shielding prevents over-lubrication, leading cause of bearing trouble. Rotating seals, where shaft extends through housings, keep dirt and moisture out of bearing chambers. Die cast rotor and interphase insulation are further assurance of long life and low maintenance.

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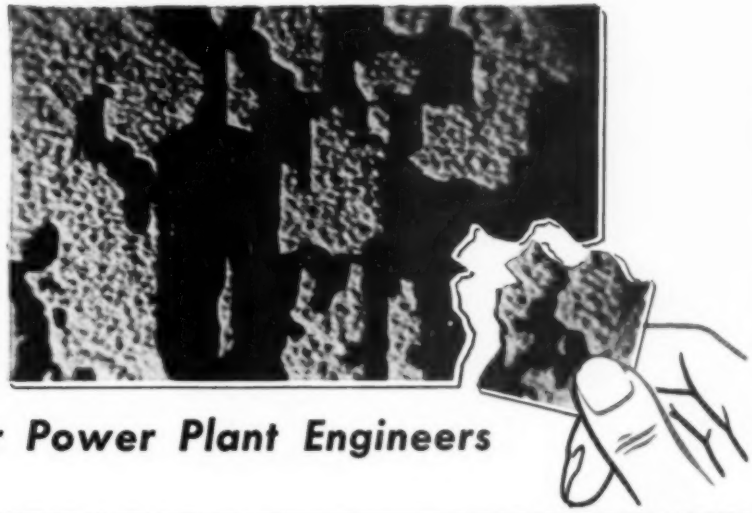
JIG-SAW PUZZLE



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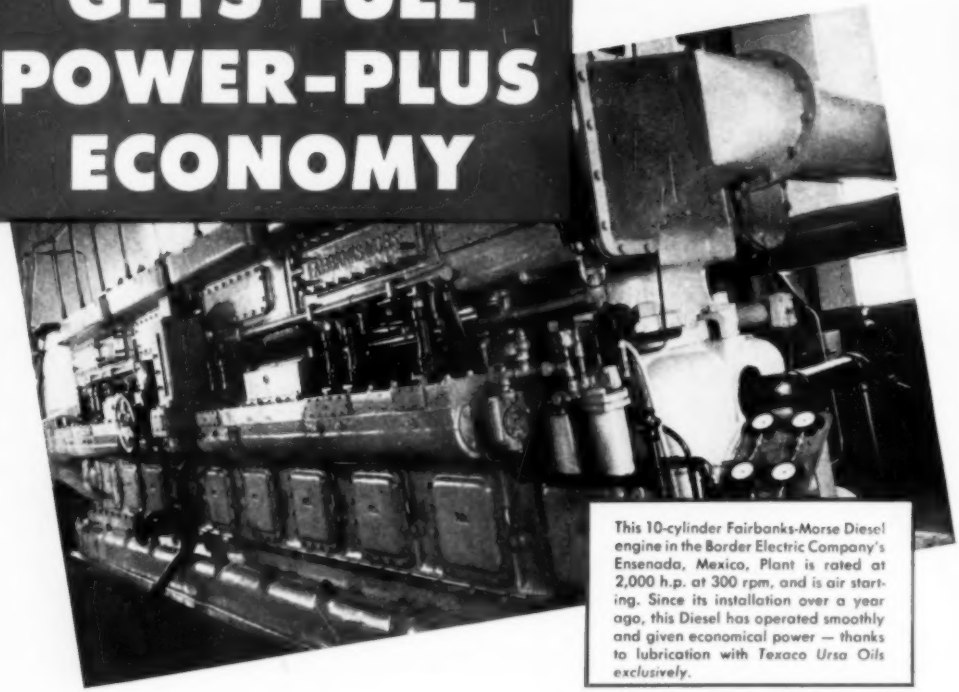

This 10-cylinder Fairbanks-Morse Diesel engine in the Border Electric Company's Ensenada, Mexico, Plant is rated at 2,000 h.p. at 300 rpm, and is air starting. Since its installation over a year ago, this Diesel has operated smoothly and given economical power — thanks to lubrication with *Texaco Ursa Oils exclusively.*

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SOUTHERN POWER AND INDUSTRY

JANUARY 1952

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Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

January, 1952

SMALL INDUSTRIAL PLANT OPERATION IS BIG BUSINESS — small plants of less than 50 employees comprise more than 80 per cent of manufacturing plants. Management competence of the owner-manager is the greatest single factor in the success of the company, according to Frank K. Shallenberger, associate professor of industrial management, Graduate School of Business, Stanford University. Discussing manpower, plant and equipment, and management, at the A.S.M.E. 72nd annual meeting, he emphasized the following:

Training Programs — formal programs may not be justified but company can use supervisory round tables, adult training courses in nearby schools, reading programs, visits to other plants, and membership in foremen's organizations . . . greater need for effective worker training in small plants for workers must be more versatile and flexible . . . foreman has extra responsibilities which in a larger plant are handled by staff people.

Working Incentives — wage incentives not necessarily best means of motivating good workers . . . group bonus based perhaps on labor cost as percentage of sales, likely to be more effective and less costly than individual incentives . . . profit sharing may be effective in stimulating the small group responsible for management decisions.

Equipment — need for versatile, yet highly productive equipment . . . clever and imaginative jigs and fixtures can go a long way in transforming the general purpose machine tools of the small shop into efficient, high production equipment . . . such equipment can reduce fatigue, operation time and operator skill requirements, and need not be elaborate or expensive . . . powered equipment can be substituted for hundreds of jobs still performed by hand, and air or hydraulic vises, traverses and feeds could be provided.

Methods — improvement in production methods may offer even greater opportunities than new materials and processes . . . simple inexpensive changes in motions, sequence, tooling, and in workplace layout can accomplish spectacular savings . . . every job, direct and indirect, offers opportunities.

LET'S THROW THE MUMBO-JUMBO AND GOBBLE-DE-GOOK about electricity out of the window. For some reason electricity seems to be mysterious. But there is no mystery. About 10 or 15 special electrical words seem to be all that are necessary in ordinary industrial plant work. Learn these few words and their simple definitions, and the mystery disappears. Men who use electricity for productive power in their plants will want to follow SP&I's "Electricity and Electric Power" series starting in this issue. Check Part I — volts, amperes, and watts — authored by Roy W. Wages, division industrial power engineer with the Georgia Power Company's Columbus, Georgia office, who has had long experience in helping his customers to understand and use the electricity his company sells.

GAS TRANSPORTED THROUGH PIPELINES will be doubled in the next 10 to 20 years, according to current estimates. To handle the increase, an addition of 4 million compressor horsepower will be needed. Westinghouse sees the GAS TURBINE, which produces its power by using the fuel in the gas line, as an ideal drive for centrifugal pipeline compressors.

The country's first installation, reported in SP&I in 1949, was an 1800 hp Westinghouse unit placed in service on a natural gas line in Wilmar, Arkansas. Westinghouse is now building a 5000 hp dual shaft gas turbine with regenerator for main transmission line pumping requirements.

FERROLUM lead-clad steel and CUPRALUM lead-clad copper, introduced at the Chemical Industries Exposition, combine the chemical resistance of lead to a wide range of concentrations of sulphuric acid with the physical strength of steel and the heat conductivity of copper. Knapp Mills, Inc., claim that the new clad metals will drastically reduce the waste caused annually by sulphuric acid. The lead-clad steel is produced by an automatic mobile lead-cladding machine; the lead-clad copper by a drawing process.

Two of the many applications noted are the heating and cooling of acids and in the plating industry. In the former, through the use of Cupralum, it is now possible to use freon instead of water directly in the coils. In the plating industry it makes possible up to a 1000 per cent increase in the charge which passes from the anode through the electrolyte to the work.

DYNEL, a vinyl resin manufactured textile fiber of the Union Carbide and Carbon Corporation, is gaining acceptance in a varied group of industrial end uses — filter cloth, work clothing, water softener bags, dust-fume bags, paint roller covers, hosiery dye nets and anode bags. The material combines such features as wet and dry strength, abrasion resistance, resistance to acids and alkalis, and washability.

Chemical and petroleum plants will be checking on the material's resistance to acids and alkalis. In one plant that processes aluminum chloride, zirconium and titanium tetrachlorides, workers often found cotton garments in tatters before a single eight-hour shift was over. They were outfitted with dynel shirts and pants. Despite acid spatterings and frequent launderings, the clothing didn't show appreciable signs of wear for almost a year.

WORKINGS OF A NUCLEAR FURNACE, a model of the Van de Graaf electrostatic generator, demonstration of radioisotope production, model of the Oak Ridge, Tennessee, uranium reactor, and illustrations of the use of radioisotopes in research are included in specially-equipped Trailmobile, now on a nine months' tour of the country. Unit is a replica of the atomic energy exhibit in the American Museum of Atomic Energy at Oak Ridge, Tenn.

Tour is under the auspices of the museum operated for the AEC by the Oak Ridge Institute of Nuclear Studies, a non-profit corporation of 29 Southern universities. First appearance of the exhibit was in Birmingham, Alabama, under the auspices of the university extension division of the University of Alabama.

MORE SCRAP IS NEEDED NOW THAN EVER BEFORE — scrap in your plant will bring high prices, so cash it in now. It is urgently needed to keep the steel mills going at full capacity to meet the needs of industry. This is serious business. The steel mills must have more scrap — and NOW. Otherwise, output will drop and all steel users will suffer.

Old, replaced machinery and equipment, rails, structural parts and other "heavy" scrap are needed mostly. But metalworking waste — turnings, borings, punchings, crop ends, etc. — is also needed.

$$$ FOR YOUR IDEAS, METHODS, ETC. — Procedures that improve production only a little are of big value in overall plant economy. As emphasized in the opening paragraphs of the preceding page, clever and imaginative jigs and fixtures can go a long way in transforming the general purpose machine tools of the small shop into efficient, high production equipment.

Send your ideas, methods, etc., to SOUTHERN POWER & INDUSTRY. Payment is made for suitable material. Articles from engineers and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor be sent to any other publication. A photo or rough sketch will make your idea more valuable.

Write the editors for additional information on any of the above items.
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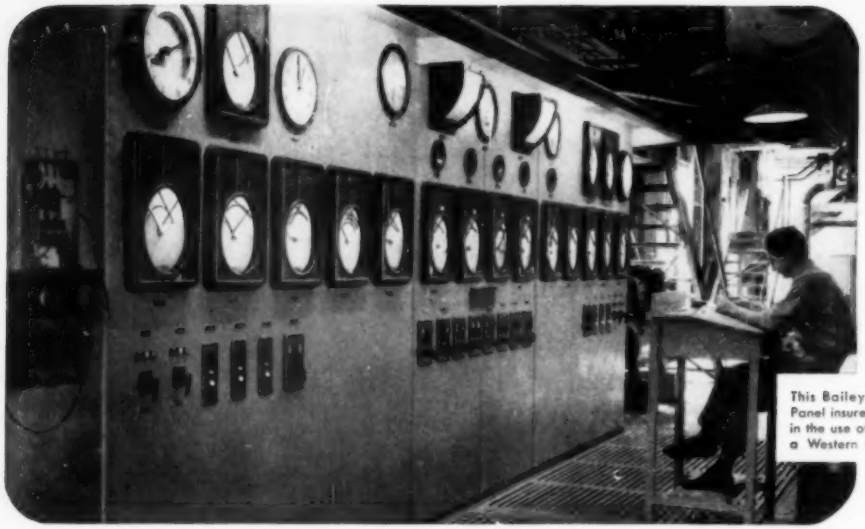

This Bailey Boiler Control Panel insures high efficiency in the use of Fuel-Dollars at a Western Chemical Plant.

What's Your Fuel-dollar Efficiency?

A dollar's worth of fuel has the *same potential* energy, no matter who's boiler it fires. But how much of the energy actually gets converted to a usable form depends on how you operate your boiler.

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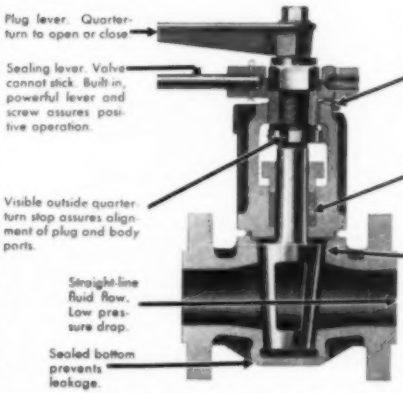
Plug lever. Quarter-turn to open or close.
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Three-way— Flanged or Screw Ends

Four-way— Flanged or Screw Ends

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Straight-way— Screw or Flanged Ends

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PERFORMANCE RESULTS

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Draft Loss	9.2 lbs.	6.5 lbs.	2.7 lbs.
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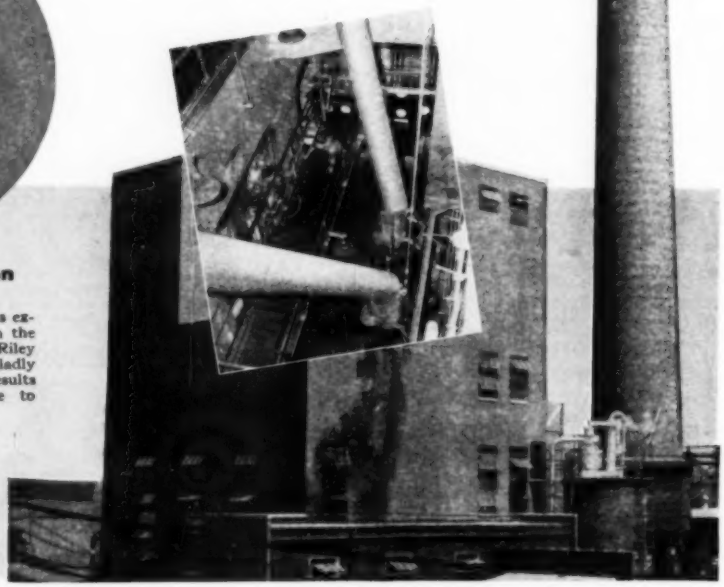
Efficiency	85.3%	86.4%	1.1%

Robert C. Holman
Plant Engineer

Mr. Holman advises he is exceedingly well pleased with the performance of the new Riley unit. We are sure he will gladly tell you of the excellent results he obtained if you care to inquire.

BIRD & SON, INC.
New Power Plant
East Walpole, Mass.



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3. Eliminating cost of separate ash hopper
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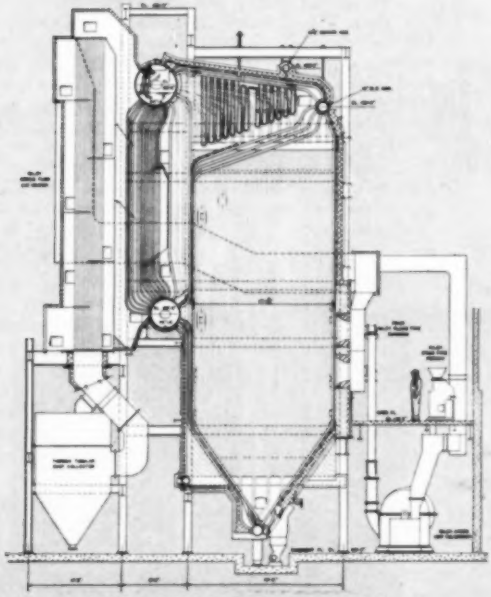

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175,000 lbs./hr. 710 lbs. pressure. 750°F. total Steam Temperature pulverized coal-fired single header hopper bottom Riley Units.

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- Chase Brass & Copper Co.
- South Carolina Gas & Electric Co.
- Pratt & Whitney Co.—7 units
- Western Electric Co.—3 units
- Monsanto Chemical Co.—2 units
- Norton Company
- Hanna Furnace—4 units
- Celanese Corp. of America—6 units
- Regel Textile Corp.—2 units
- American Viscose Co.
- Great Lakes Steel Corp.
- Cluett Peabody Co.
- Waldorf Paper Products—2 units
- New Orleans Public Service Co.
- U. S. Rubber Co.—3 units
- Continental Can Co.
- Utah Power and Light Co.
- Gould Paper Co.—2 units
- South Carolina Public Serv. Auth.—2 units
- Syracuse University—2 units
- Dairyland Power Co-op.—3 units
- Hooker Electro Chemical Co.—3 units
- Superior Water, Light & Power Co.
- Whippany Paperboard Co.—2 units
- Rayonier, Inc.
- U. S. Finishing Co.
- Northern Paper Mills—2 units
- Cities Service Corp.
- Calumet & Hecla Consol. Min. Co.
- Otter Tail Power Co.
- Swift & Co.
- C. H. Masland & Sons
- Upper Mich. Power & Light Co.
- Los Angeles Water & Power Dept.
- Champion International Co.
- Central Ohio Light & Power Co.—2 units

*These companies have placed repeat orders.

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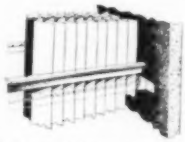
Insures Long Life And Top Performance

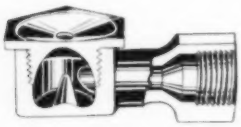
Frequent cleaning and flushing prevents corrosion.



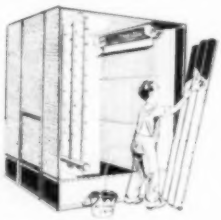
Buffalo Eliminator plates are easily removed for cleaning and painting.

A regular program of simple maintenance can keep a good air washer or humidifier functioning at its best almost indefinitely.

The tank should be cleaned and flushed once a week. One important result of this is the prevention of scaling and corrosion from evaporation of any water containing large quantities of dissolved solids. Eliminator plates, too, should be removed and cleaned frequently. Both interior of washer as well as eliminator plates should be thoroughly cleaned and painted, once a year or more often if operating conditions warrant. Spray nozzle orifices should be inspected for scale deposits. The pump should be properly packed, and the suction screen kept clean, to assure full pumping efficiency and adequate spray. (If spray water pressure drops suddenly and rises slowly, screen is probably dirty).



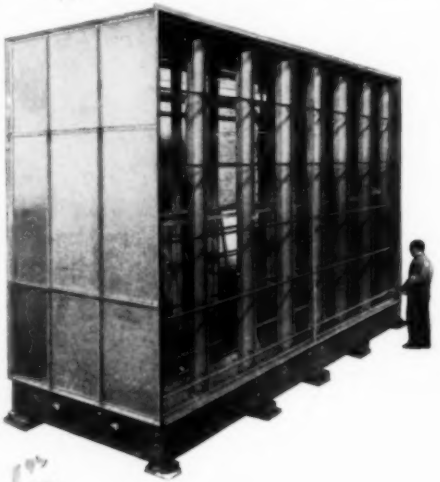
Buffalo Non-Clogging Spray Nozzle with removable cap.



Air washer eliminator plates should be painted yearly or oftener if necessary.

"Buffalo" AIR WASHER

The first "Buffalo" Air Washers were cleaning air for industry fifty years ago, and many of those original units are still giving a good account of themselves. Regular maintenance, like the described, plus good basic design, is responsible. "Buffalo" Air Washers today have many improvements that make for easier maintenance —non-clogging spray nozzles, demountable eliminator plates, better accessibility, "Buffalo" Pumps of constantly improved design. The experience of the "Buffalo" organization is at your service in any problem concerning air cleaning or conditioning. Write us.



"Buffalo" FIRST FOR FANS

BUFFALO FORGE COMPANY

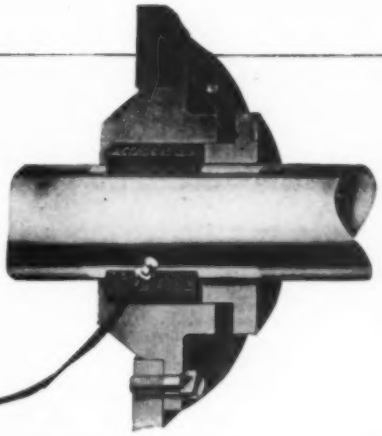
530 BROADWAY BUFFALO, N. Y.

Canadian Blower & Forge Co., Kitchener, Ont. Sales Representatives in all Principal Cities

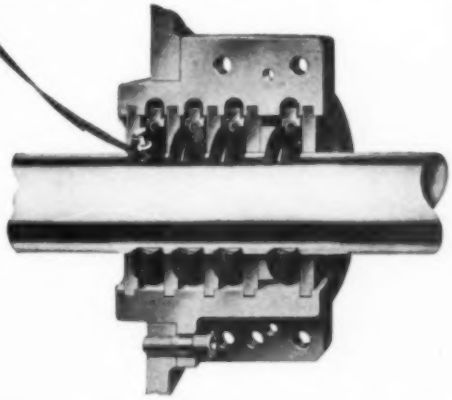
VENTILATING FORCED DRAFT | AIR WASHING COOLING | AIR TEMPERING HEATING | INDUCED DRAFT PRESSURE BLOWING | EXHAUSTING

COPPUS TURBINES

offer you a choice of packing rings



STANDARD METALLIC RING PACKING — Made of high grade asbestos cores encased in specially treated lubricated aluminum foil. Recommended as a low-friction, long-service packing for steam temperatures up to 850 F and back pressures up to 50 lb. Adjustable packing glands keep leakage at minimum. Easy access to packing rings.



OPTIONAL CARBON RING PACKING — Consists of three carbon packing rings on the pressure side and one beyond the leak-off section. Each ring has three segments held together by a stainless steel garter spring. For back pressures up to 75 lb. Standard for vacuum or gas operation, or when leak-off is desired.

Heavy chrome plating on shaft at stuffing box is common to both types of Coppus packing.

Coppus Turbines ranging from 150 hp down to fractional in 6 frame sizes

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When you buy turbines rated close to your exact horsepower needs, you save plenty of money. That's because turbines are generally priced in proportion to their size. The wide range of sizes of Coppus Turbines promises purchasing economy for you from the 150 hp size down to the smallest. As for operating and maintenance economies, you get them, too, from such other features as: greater number of manually operated valves for individual control of steam nozzles; replaceable cartridge-type bearing housings and others. For complete details . . .

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BOILER WATER LEVEL Shines

It's light! It's bright! It's right! You see instantly the accurate boiler water level in your Yarway Flat Glass Gage because *the meniscus at water level stands out like a brilliant star . . .* thanks to the new Yarway Type "M" Illuminator.

The Type "M" Illuminator is specially-designed to give maximum brilliance to Yarway flat glass inserts, and to spot the water level over its entire traverse. The superior penetration of its blue-white light cuts through extraneous light, dust particles in the air, and deposits on the gage glasses. Effective over longer distances.

New or already-installed Yarway Flat Glass Gages may be equipped with the Illuminator. Yarway Illuminators may be installed in pairs on four-glass gages.

Get in touch with your nearest Yarway office for further details on this latest Flat Glass Gage development, or write direct to . . .

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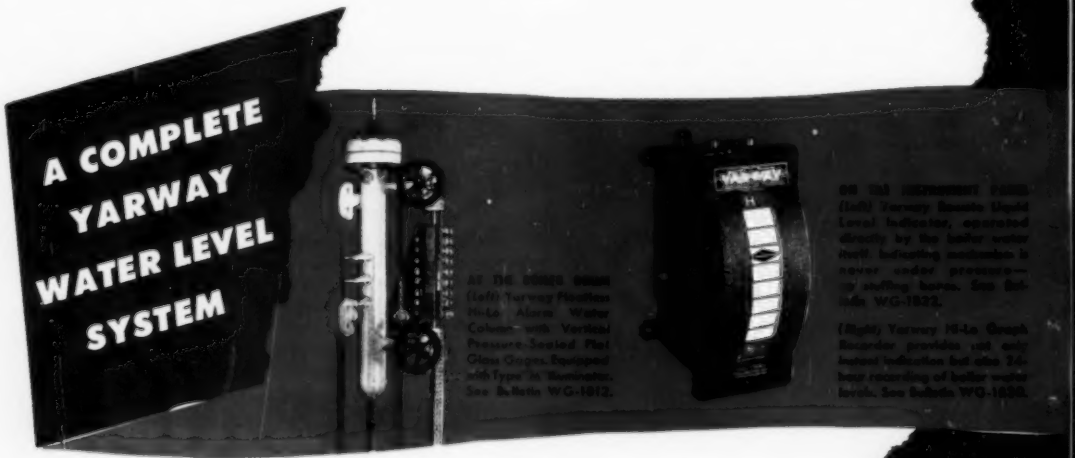
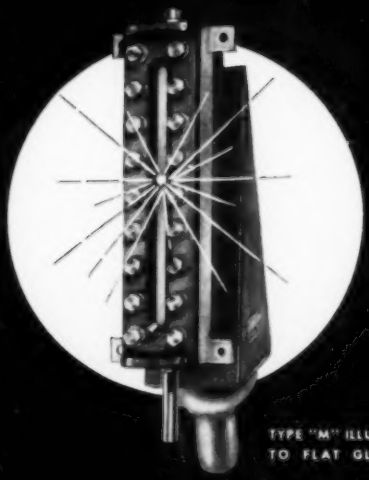
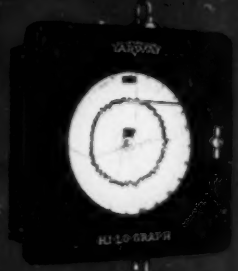


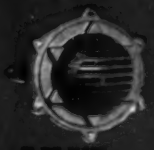
YARWAY STEAM

like a Star



TYPE "M" ILLUMINATOR ATTACHED TO FLAT GLASS GAGE INSERT





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585	602	608	611	640	643	654	661	716	727	741	754	802	803	856	939
864	904	919	953	957	961	994	B10	B11	B12	B13	B14	B15	B16	B17	B18
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Continued on page 112

1-52-1

Please send me without obligation, free booklets described in the January, 1952, issue of SOUTHERN POWER AND INDUSTRY as circled below:

7	23	26	34	37	49	56	58	64	69	70	81	84	95	105	120
141	162	166	190	238	240	254	263	269	275	277	310	313	326	352	356
401	403	407	440	446	459	478	482	483	503	506	507	519	538	552	561
565	602	608	611	640	643	654	661	716	727	741	754	802	803	806	835
864	904	919	953	957	961	994	B10	B11	B12	B13	B14	B15	B16	B17	B18
B19	B20	B21	B22	B23	B24	B25									

Also send further information on following New Equipment (pages 89 thru 96)

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16

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Equipment and Review Editor
SOUTHERN POWER & INDUSTRY
806 Peachtree St., N. E.
Atlanta 5, Ga.

List Items You Want,

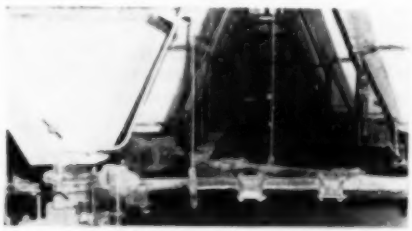
Tear Out and Mail One of the Attached Cards Now!

Please be sure to fill in your Firm's Name and your position on the Coupon. This service cannot be extended to you unless this information is furnished.

A-S-H Automatic Dust Mixer and Unloader at Potomac River. This new generating station is at Alexandria, Virginia, within view of the Nation's Capitol.

One of our latest ALL-PNEUMATIC systems

PEPCO's new $25,000,000 Potomac River Power Station, with a projected capacity of 400,000 kilowatts, is now operating two 80,000 kilowatt units. Each of these units has an 800,000 lb-per-hr boiler designed initially to burn pulverized coals having an ash content of from 4.5 to 12%. The furnaces have dry hopper bottoms with shaded ashpits that are much cooler than those of conventional design. Bottom ash is removed in a completely dry state by gravity discharge through manually-operated slide gates into the vacuum transport system. This operation requires the time of one operator for only about 20 minutes every eight hours. The 33 fly-ash hoppers on each boiler unit are emptied automatically by this same pneumatic system.



A few of the fly-ash hoppers, showing A-S-H air-electric operated Dust Valves.

Whether, like Potomac, your situation calls for a pneumatic system, or whether it would be better adapted to a hydraulic system, it's wise to consult our experienced engineers. We've been designing all types and combinations for many years, and you can depend on our recommendations.

THE ALLEN-SHERMAN-HOFF CO.

Dept. L—259 E. Lancaster Ave., Wynnewood, Pa.

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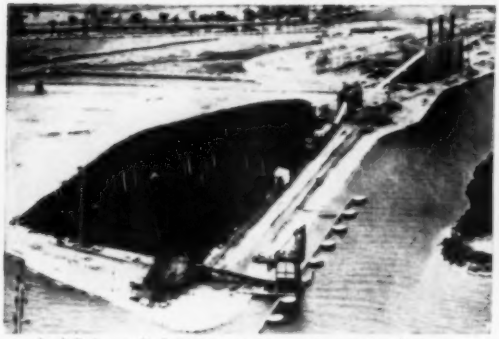
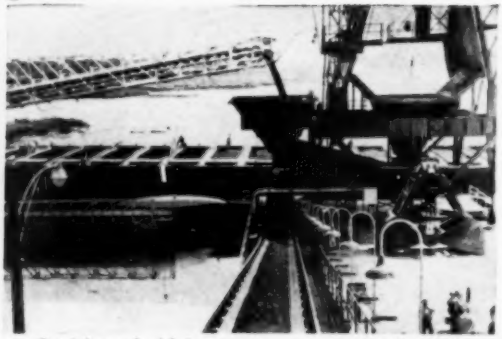
HYDROJET *(hydraulic)* HYDROVAC *(pneumatic)*

materials handling systems

LINK-BELT engineering experience...

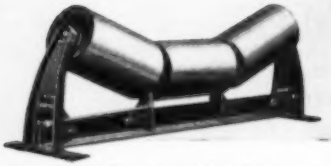


Link-Belt supplied this power plant with complete belt conveyor system for unloading, storing and reclaiming coal.



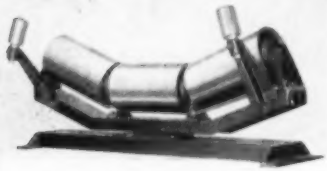
Receiving end of belt conveyor system, showing boat self-unloading coal into hopper. Another hopper and feeder handle barge coal.

Plus LINK-BELT quality components...



SERIES 100 TROUGHED BELT IDLERS. Strong, balanced integral rolls revolve on high-grade roller bearings. Grease-in, dirt-out seal, large reservoir preserve lubricant.

RUBBER-TREAD IMPACT IDLER for loading points protects the belt by absorbing the shock of heavy materials or lumps delivered from above.



BELT-TRAINING IDLER for automatic belt positioning. The actuating rolls respond to slightest contact — quickly recede and center the belt to minimize wear.

...add up to your best bet in

BELT CONVEYORS

WHAT'S your materials handling problem? Tonnage, distance or a combination of the two? Heavy or light materials? Large lumps or fines? Continuous or intermittent operation?

Whatever the conditions, you'll find the right answers at Link-Belt. For Link-Belt designs conveyor systems to meet your requirements. Backed by unmatched materials handling and power transmission experience, our conveyor specialists help you and your consultants get the right equipment in the right place.

One Source—One Responsibility

Link-Belt makes all the various elements — all types and sizes of idlers, takeups, pulleys, trippers, bearings and power transmission drives. Plus all related equipment — other types of conveyors, feeders, elevators, car dumpers and shakers.

And Link-Belt will build your supporting structures and enclosures . . . install the job completely. One source — one responsibility. Every detail receives the proper attention to assure you an efficient, trouble-free, long-life conveying system.

The next time you need belt conveyor engineering assistance, call the Link-Belt specialist in our office near you.

LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Atlanta, Dallas 1, New Orleans 12, St. Louis 1, Charlotte 2, N.C., Baltimore 18, Birmingham 3, Houston 1, Jacksonville 2. Distributors Throughout the South.

Burn REFUSE or COAL

With DETROIT STOKERS

Successful Installations Burn

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Peanut Shell Refuse

—Either separately or in combination with coal, oil or gas

The use of the Detroit RotoStoker and RotoGrate Stoker for various kinds of waste materials, followed quite naturally its established use for burning an extremely wide range of Coals, as well as high moisture Lignite.

Through the years, installations with steam boilers of a wide range of types and sizes have been made for burning waste materials.

If you have combustible refuse, the best disposal method is *burning it* which will avoid nuisance or pollution and at the same time will salvage the fuel value.

Detroit RotoStokers and Detroit RotoGrate Stokers are readily adapted and highly successful for refuse burning.

Write for this 24 page Booklet 505 which gives Engineering data on our refuse burning installations.

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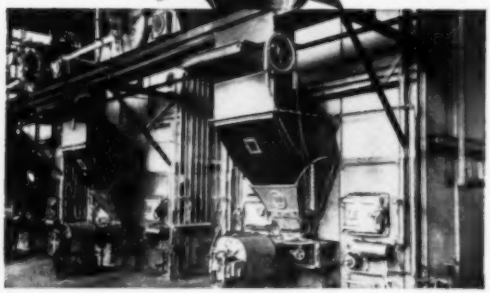
"Orchids to Oppenheimer!

THAT NEW COAL HEATING SYSTEM HE DESIGNED SAVED $14,000 THE FIRST YEAR!"

says Carl R. Beckert, President, Thomas Young Orchids, Inc., Bound Brook, N. J.

"We're the largest orchid-growers in the world—Phil Oppenheimer is our consulting engineer. Had to have the most *dependable* heat we could find—steady, quickly available—to protect two million dollars' worth of orchid plants. Our new coal-fired plant gives us that kind of heat—in addition saved us $14,000 the first year! We've discovered that with modern equipment coal is as clean and automatic as any other fuel—and to do the job with oil would have meant an overall cost of 16% more! More than that, we can't take a chance on uncertain winter fuel deliveries. With *bituminous* coal we can store a year's fuel supply right on the ground."



The firing aisle at the new plant. This highly efficient coal equipment cut the company's fuel costs by 23%—is so completely automatic that it saved $6,000 the first year on labor costs, too!

This 300-ton silo that Young installed does away with former handling and shovelling costs. Coal is fed from the silo by a screw conveyor to each boiler's stoker-hopper—the coal is weighed on its trip.

- Use coal now? Get ALL coal's economy with highly efficient modern equipment. Building a new power plant? Find out how much more economical, efficient a job *bituminous* coal can do. Call in a competent consulting engineer. He can show you the modern coal-handling and combustion installations that will save most while meeting your particular needs. Remember you can count on *bituminous* coal! Of America's total fuel reserve—92% is coal! Even today oil is *imported*—while America can and does *export* coal! Ample coal reserves plus the outstanding efficiency of America's mining companies give coal users *the greatest possible assurance of a dependable fuel supply at stable prices.*

If you're running your own steam plant, here are just a few down-to-earth facts you can't afford to ignore!

COAL in most places is today's most economical fuel.

COAL resources in America are adequate for all needs—*for hundreds of years to come.*

COAL production in the U.S.A. is highly mechanized and by far the most efficient in the world.

COAL prices will therefore remain the most stable of all fuels.

COAL is the safest fuel to store and use.

COAL is the fuel that industry counts on more and more—for with modern combustion and handling equipment, the inherent advantages of well-prepared coal net even bigger savings.

BITUMINOUS COAL INSTITUTE
A Department of National Coal Association
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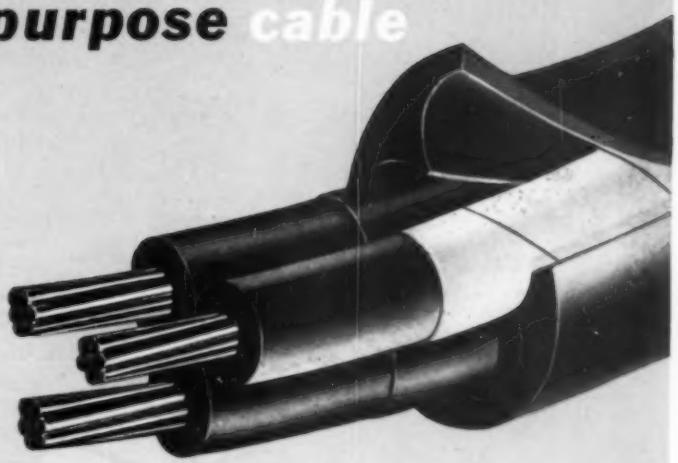
FOR HIGH EFFICIENCY ★ FOR LOW COST

YOU CAN COUNT ON COAL!

Durasheath

the ***all-purpose*** *cable*

for both
power
and light
services



Durasheath's* tough neoprene jacket stubbornly resists electrolysis, corrosion, temperature extremes, cutting, abrasion, impact, flame, oil, grease, moisture and most soil acids and alkalies.

Run it overhead, in ducts, or buried underground—or all three in one continuous run.

It's flexible, easy to handle, economical to install; made in single or multi-conductor construction.

Your nearest Anaconda Sales Office or Distributor can show you why it's good business to install this versatile, all-purpose cable. Just ask them. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

*Trademark

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- ✔ Assured Safety
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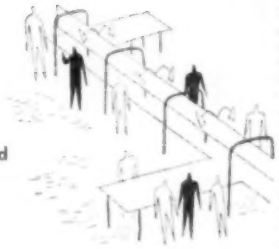
the truth about Dow Corning Silicones...

. . . is more fantastic than the patter of the pitchman or the spiel of the barkers that doubled in advertising and sales a generation ago. For example:

- **Silicone (Class H) electrical insulation makes motors and other kinds of electrical equipment last 10 times as long as they ever did before.**
- **These same insulating materials are used to double the power per pound ratio in electric machines.**
- **Silastic,* the Dow Corning silicone rubber is used to seal hot air at 600°F., hot oil at 350-400°F., limit switches and bomb bay doors at —100°F.**
- **Dow Corning Silicone oils and greases make permanent lubrication a practical reality.**

To many engineers and executives, such silicone facts as these still sound too good to be true. That's why we have built and assembled 16,000 pounds of demonstration units and typical applications to prove that our silicone products will do all that we claim for them. This is the first comprehensive Silicone Exposition ever assembled. Previewed in Washington, D. C. during the week of October 22nd, this exhibit will be given private showings in major industrial centers across the country.



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If you want to know more about this Exposition write for complete information including our new 32-page book which answers in simple words and pictures, the $64 question, "What's a Silicone?" Address Department **BJ-13**

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In CANADA: Fiberglas Canada, Ltd., Toronto • In GREAT BRITAIN: Midland Silicones, Ltd., London

Directional reverses come with machine gun speed for the transmission belt shown above. It's Republic's Challenger Belting on a reverse power drive installation at Stantonsburg Lumber Company, Stantonsburg, North Carolina.

Constant reverse flexing like this is tough on any belt, yet Republic's Challenger, now in its third straight year of continuous service, shows no signs of tiring.

Of course, Republic Challenger Transmission Belting is designed for heavy industrial drives where shocks and stresses are encountered, and is also perfectly suited to high-speed drives operating over small pulleys.

Challenger is a *pre-stretched* belt that doesn't loosen when pulling extra heavy loads. It's a belt that's free from fastener trouble because it is built with hard-woven duck. All edges are sealed against moisture.

Ask your local Republic Distributor about Challenger Belting today or write direct for information. Standard widths and plies are available in both roll or endless lengths. Both top and bottom surfaces have non-slip friction for better pulley traction.

See Your Local Republic Distributor

Close contact with experts like the Taylor Parker Company, Republic's Distributor in Norfolk, Virginia, who installed this Challenger Transmission Belt, assures success in industrial rubber applications. Contact your local Republic Distributor now about all your problems in . . . . HOSE, BELTING, PACKING and EXTRUDED and MOLDED RUBBER PRODUCTS.

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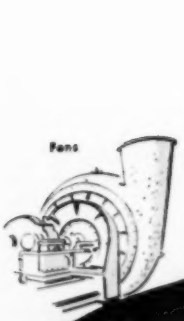
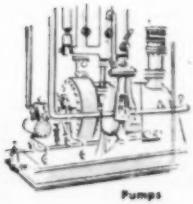
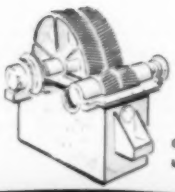
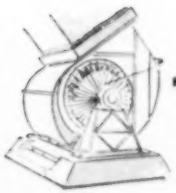
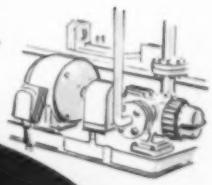


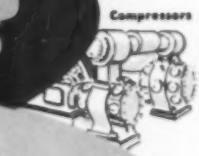




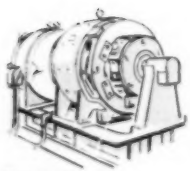




How many oils do you use for auxiliary plant equipment ?



You need only GULF HARMONY OIL



—Outstanding many-purpose oil for equipment like this!

You can lubricate all your plant auxiliary equipment better with just this one oil—Gulf Harmony Oil. It's equally effective for sleeve-type and antifriction bearings, hydraulic mechanisms, compressor cylinders, and many types of gears.

Here are a few of the many reasons why Gulf Harmony Oil performs so well in so many different applications. First, it has high resistance to oxidation and the formation of sludge. In oil-circulating systems, reservoirs, hydraulic systems, and antifriction bearing pedestals, this means freedom from harmful deposits and insures against premature oil changes.

Then the lubricating film provided by Gulf Harmony Oil has preferential wetting characteristics for metal—it displaces moisture, interrupts its corrosive action. That's how this quality oil prevents rust on all oil-bathed surfaces—a particularly important function in precision hydraulic valves and in antifriction bearings operating under damp conditions.

And because it has good water-separating characteristics, there is less chance of emulsification and the useful life of each fill is prolonged.

Gulf Harmony Oil is available in a wide range of viscosities and is inhibited to provide more effective protection against wear under boundary conditions.

For further information on Gulf Harmony Oil and for expert help on your lubrication problems, call in a Gulf Lubrication Engineer today. Write, wire, or phone your nearest Gulf office.

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GULF INDUSTRIAL LUBRICATION

The TERRY TURBINE

TURBINES FOR *Air Conditioning* AT MADISON SQUARE GARDEN

In 1925 Madison Square Garden installed three Terry Multi-Stage Turbines to drive air conditioning and refrigeration compressors. These units deliver 290 hp at 3500 rpm with steam conditions of 100 psi exhausting to a 26 in. vacuum.

After 22 years experience Madison Square Garden installed three more Terry Multi-Stage Turbines, one of which is shown above. This unit delivers 330 hp, at 5650 rpm, with steam at 100 psi exhausting to a 25 in. vacuum.

The same engineering talent and manufacturing facilities that produced these turbines are available to assist you in obtaining efficient power generation.

Any of our District Representatives will be pleased to give you full information on a turbine drive for your requirements. No obligation. May we send you descriptive bulletin?

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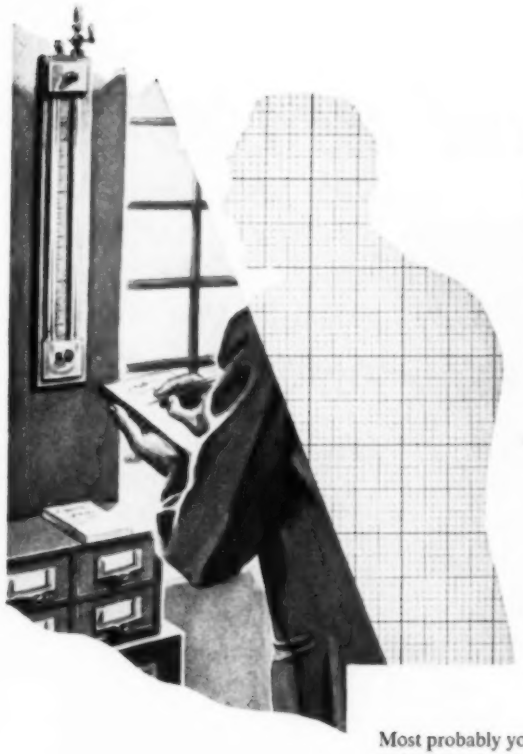
THE TERRY STEAM TURBINE COMPANY
TERRY SQUARE, HARTFORD, CONN.



This 'dust' man can help you...

Solve Stack Dust Problems

He assures peak efficiency in Fly Ash Collection on boilers from 50hp to 'the biggest yet'!

Most probably you know of the benefits you obtain from the collection of industrial escape-dust: new, higher efficiencies, a boost in employee morale, more favorable plant-community relations.

But—unless your dust collecting system is designed to the individual requirements of your plant, much of these potential benefits stand to go up the stack.

As a result, a Buell Engineer is a good man to know. Buell's staff of industrial 'dust' men draw on more than 200 man-years of experience in the design and construction of high-efficiency, trouble-free Dust Collection Systems. They can discuss the success of hundreds of Buell Installations, and how one can be designed for you.

For full information about the ***three basic systems*** of efficient Dust Collection and Dust Recovery write today. Ask for the new illustrated Buell 'Dust Collection' bulletin. It can be a highly profitable move. Buell Engineering Company, Dept. 80-A, 70 Pine Street, New York 5, N. Y.

'SF' Electric Precipitator collecting nuisance dust in a foundry.

ELECTRIC CYCLONIC

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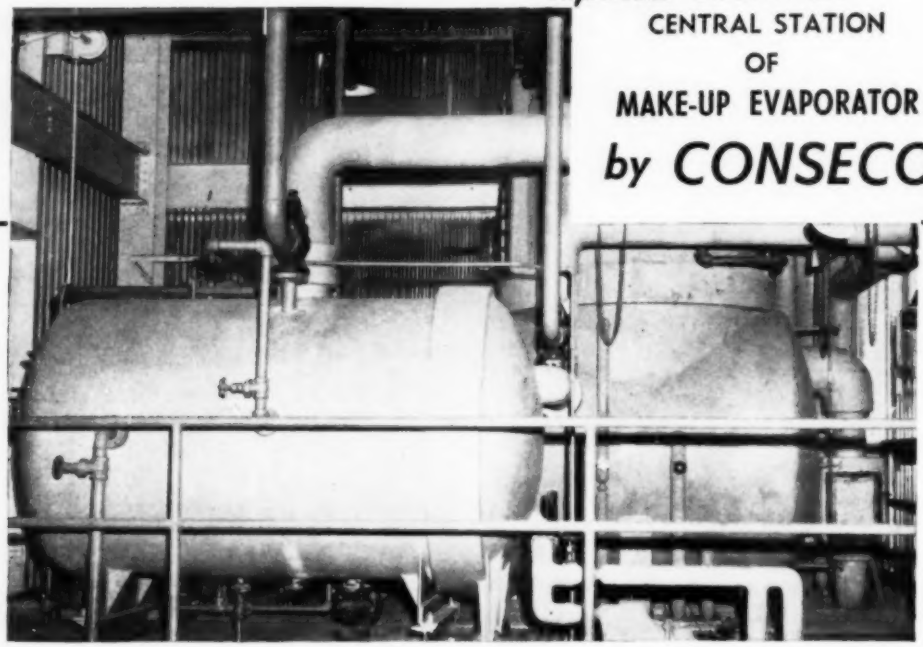
HIGH EFFICIENCY CYCLONES • ELECTRIC PRECIPITATORS
TYPE 'LB' COLLECTORS • LOW DRAFT LOSS COLLECTORS
SPECIAL PURPOSE COLLECTORS • DUST HOPPER VALVES

ENGINEERED EFFICIENCY IN DUST COLLECTION

"Quickly Repaid its Cost—"

reports SOUTHWEST CENTRAL STATION OF MAKE-UP EVAPORATOR *by* CONSECO



This Conseco Make-Up Evaporator is installed in a large central station in the Southwest. It is a horizontal internal tube nest type unit having a 54 in. diameter shell 154 in. long.

Its output capacity is 4,000 lb. vapor per hour at a purity of better than 4 ppm in the condensed vapor. The unit delivers vapor at 22 psia. using extraction steam at 62 psia. To facilitate bundle removal, the bundle is externally supported on heavy duty trucks and internally on slide rails.

The simplicity and cleanliness of Conseco evaporator design is another typical example of Conseco's many contributions to modern design and construction in power plant equipment. It will pay you to consult Conseco engineers on your requirements.

Write for helpful bulletins on Ejectors, Condensers, Evaporators, Boilers and Pumps.

CONSECO LINE includes: BOILERS • CONDENSERS • STEAM AIR JET EJECTORS • DEAERATORS • CLOSED HEATERS

CONSECO

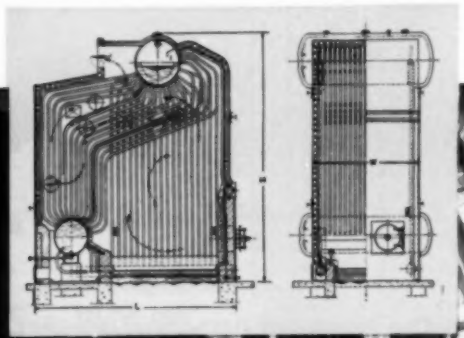
CONDENSER SERVICE & ENGINEERING CO.

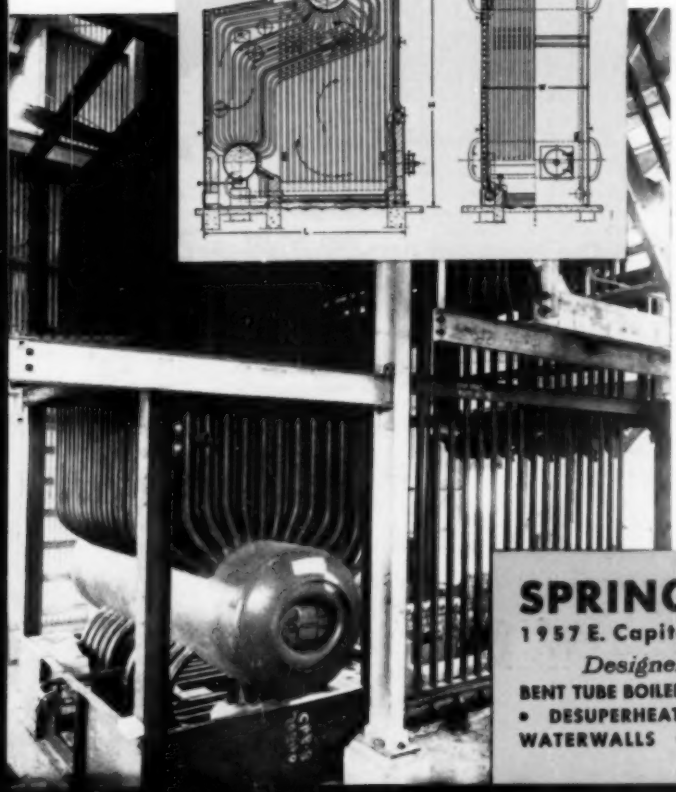
HOBOKEN, NEW JERSEY

Popular Choice!

SPRINGFIELD TYPE C *Standardized* 2-Drum Boilers

Across the country, leading industrial plants have made Springfield Type C 2-Drum Boilers THE POPULAR CHOICE where steam is needed for power, process, or heating service! Because these advanced designs are produced in a wide range of *standard* sizes, delivery time and engineering costs are held to a minimum. Users get many advantages: Positive Circulation... High Reliability... Water Cooled Furnace... Dry Steam—steam delivery tubes discharge above water level... AND *good efficiency with any type of fuel you want to burn!* Superheater, economizer, and air heater, if desired. For quotations and information, see your local Springfield representative or write us TODAY.





- **CEREAL MAKER**—30,000 lb. Springfield Type C unit for America's largest manufacturer of cereals and grain food products. Oil and gas fired. *Location: Belmond, Iowa.*
- **LUMBER MILL**—Two 65,000 lb. Springfield Type C units for large West Coast lumber company. Designed for firing with wood waste. *Location: Gardiner, Oregon.*
- **INSULATING MATERIALS**—50,000 lb. Springfield Type C unit for insulation maker. Spreader stoker firing. Operating pressure, 250 psi. *Location: Dubuque, Iowa.*
- **BUILDING MATERIALS**—30,000 lb. Springfield Type C unit for well-known maker of pressed sheathing and board. Gas and oil firing to 450 psi. *Location: Los Angeles, California.*
- **PLYWOOD PLANT**—30,000 lb. Springfield Type C unit for western plywood mill. Designed for firing with wood waste. *Location: Portland, Oregon.*
- **STEEL MILL**—35,000 lb. Springfield Type C unit for maker of steel forgings. Spreader stoker firing. Operating pressure 160 psi. *Location: Gary, Indiana.*

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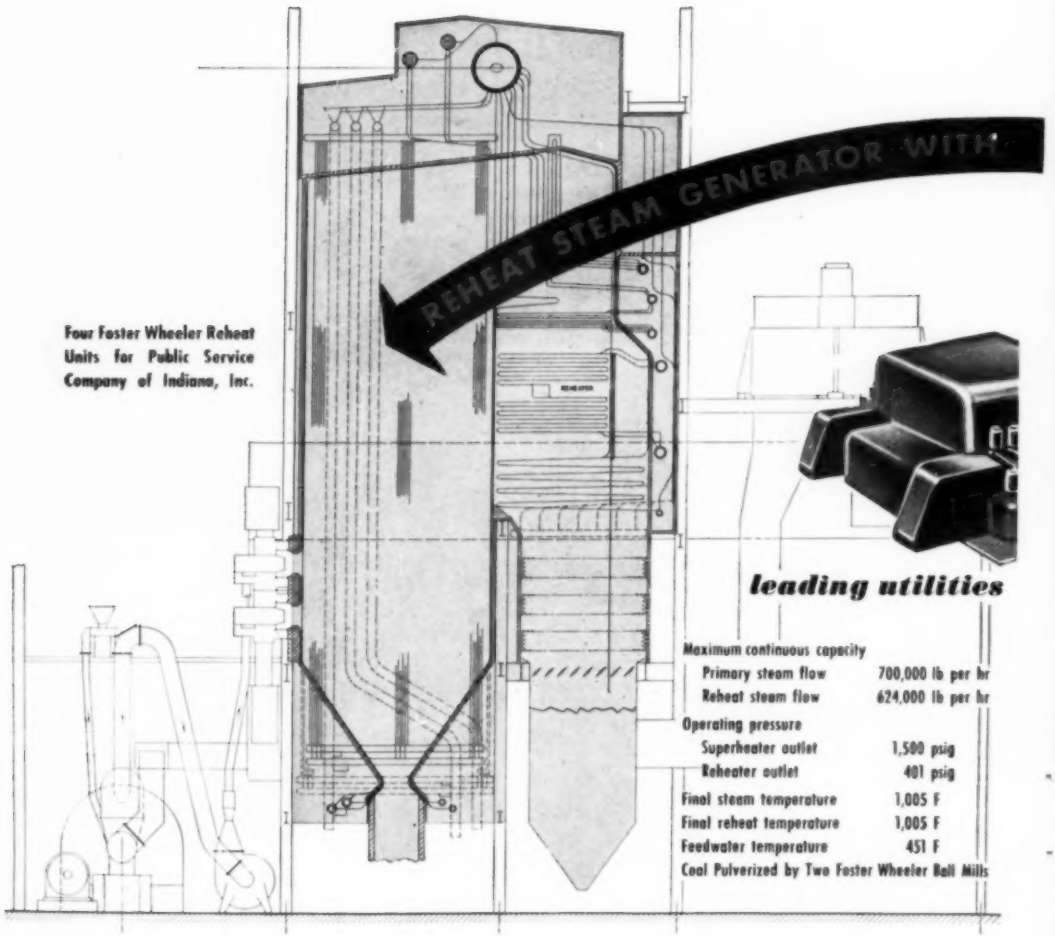
1957 E. Capitol Avenue • Springfield, Illinois

Designers, Fabricators and Erectors of

BENT TUBE BOILERS • STRAIGHT TUBE BOILERS • SUPERHEATERS • DESUPERHEATERS • AIR HEATERS • ECONOMIZERS • WATERWALLS • COMPLETE STEAM GENERATING UNITS

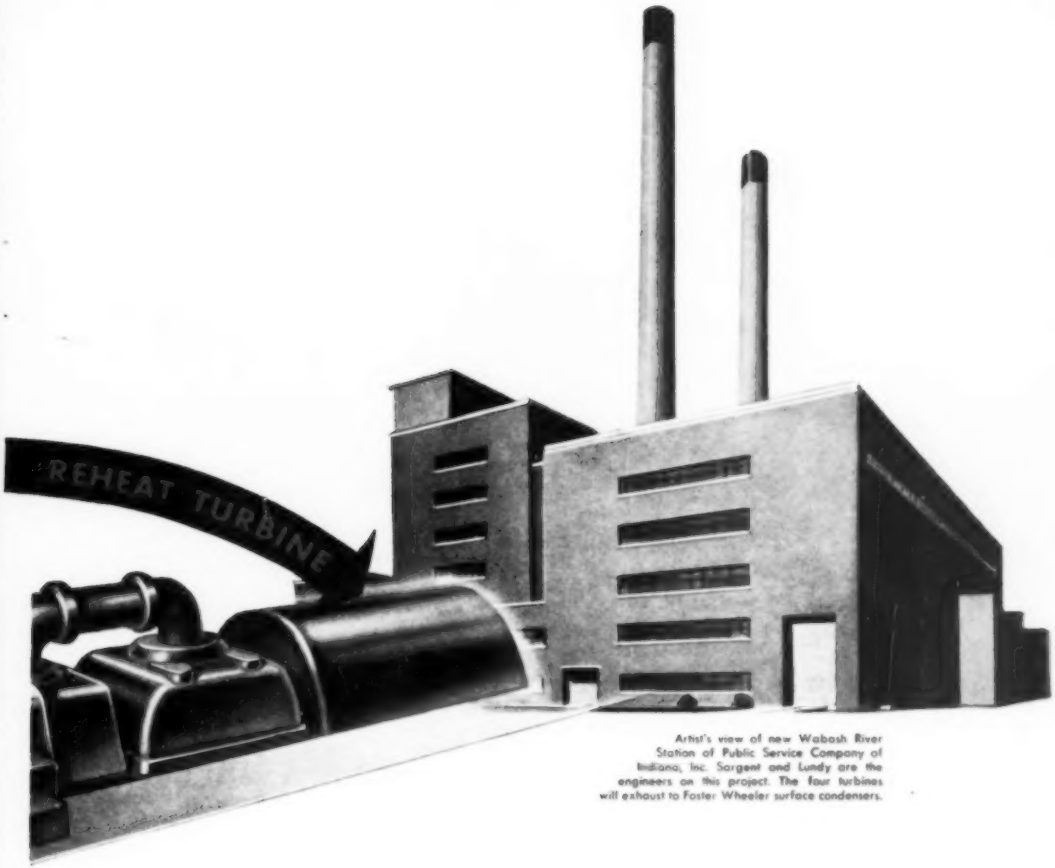
Integrating



Four Foster Wheeler Reheat Units for Public Service Company of Indiana, Inc.

leading utilities

Maximum continuous capacity	
Primary steam flow	700,000 lb per hr
Reheat steam flow	624,000 lb per hr
Operating pressure	
Superheater outlet	1,500 psig
Reheater outlet	401 psig
Final steam temperature	1,005 F
Final reheat temperature	1,005 F
Feedwater temperature	451 F
Coal Pulverized by Two Foster Wheeler Ball Mills	



Artist's view of new Wabash River Station of Public Service Company of Indiana, Inc. Sargent and Lundy are the engineers on this project. The four turbines will exhaust to Foster Wheeler surface condensers.

are ordering Foster Wheeler reheat steam generators

The large investment in present day power plant equipment dictates the careful selection of major components so as to avoid costly forced outages. Foster Wheeler engineers have always sought to refine the techniques of steam generation. They therefore took an early interest in the development of reheat where operating and control characteristics of the reheat boiler are integrated with those of the reheat turbine during every phase of service. Almost three decades ago, these engineers were responsible for the utilization of the characteristics of radiant and convection superheaters in series. Over "500 radiant superheater years" in one utility alone attest to the reliability of radiant surface for superheating.

The reheat steam generator illustrated is designed with a combination radiant and convection superheater and an all convection reheater. The chief advantages of this type of Foster Wheeler reheat steam generator may be listed as follows:

- complete freedom from furnace slagging is assured because furnace can be designed to suit fuel characteristics rather than reheat cycle duty requirements
- permissible wider selection of fuel of varying slagging characteristics
- location of the reheater deep in the convection zone assures safer metal temperatures during all starting, shutting down, and emergency operating conditions

This design also incorporates such features as:

- complete drainability of all superheating and reheating surfaces essential to quick and normal starts
- wide range of precise control of final steam temperature
- fully independent means of controlling primary and reheat steam temperatures.

These features provide for complete integrating of steam generating unit with turbine requirements under normal, quick start or emergency conditions.

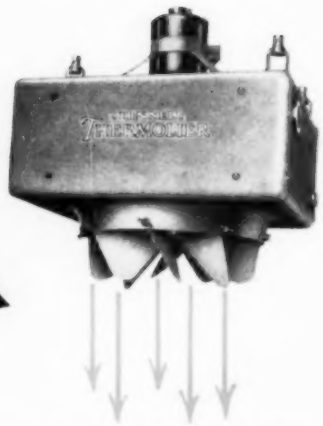
FOSTER WHEELER CORPORATION • 165 BROADWAY, NEW YORK 6, N. Y.

FOSTER WHEELER

DOWNRIGHT

better performance

Vertical Delivery
THERMOLIER
Unit Heaters . . .



RIGHT DOWN

where maximum heat is desired...

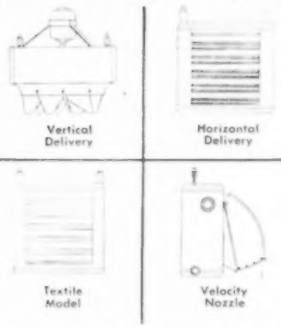
in warehouses, plants and other hard-to-heat buildings

HEATING COMFORT AND ECONOMY. Heat is forced down to the working level . . . not banked uselessly at the ceiling level. Thermoliers provide quick heating from a cold start. Desired room temperatures are easily maintained within a close range.

ADAPTABILITY TO EQUIPMENT AND FLOOR LAYOUT. The units and the simple piping are overhead where they do not interfere with arrangement of operating machinery or equipment and do not take up valuable floor or wall space. Units are easily relocated at any time to meet changes in plant layout or heating requirements.

LOW FIRST COST. Thermoliers are so efficient and so compact that their heating capacity is often equivalent to the capacity of cast iron radiation or pipe coils of twice the cost.

4 MODELS . . . . . 18 SIZES



A thermostatic trap, the simplest and least expensive of all traps, is practical because of Thermolier's exclusive cooling leg.

Maximum capacity assured, annoying destructive water hammer eliminated — by built-in pitch of tubes and internal cooling leg which assure continuous drainage of condensate.

Damaging strains caused by expansion and contraction eliminated by "U" type expansion tubes.

Safety and durability assured with leak-proof tube-to-header construction.

Five other important construction features. Write for Thermolier Catalog.

GRINNELL

WHENEVER PIPING IS INVOLVED

Grinnell Company Inc., Providence 1, Rhode Island • Sales Offices and Warehouses in Principal Cities

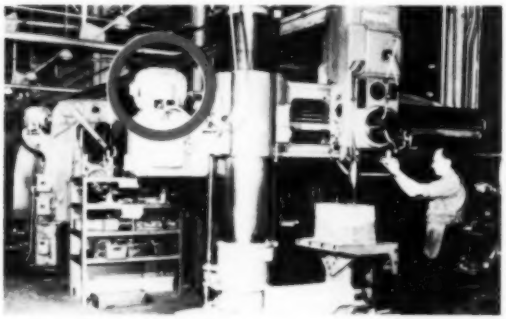
pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco humidification and cooling systems

"We have three shifts in operation," says Julius J. Domonkos, Vice-President in Charge of Manufacturing, Bell Aircraft Corporation. "That's full production on a 24-hour day basis. For the past 10 years we've been depending on Tri-Clad motors to carry the load. We've never regretted putting our confidence in this fine motor!"

G-E Tri-Clad Motors drive the machines that are instrumental in producing helicopters, guided missiles, rocket motors, research aircraft, and jet aircraft engine nacelles for our rapidly expanding armed forces. At Bell Aircraft Corporation, G-E Tri-Clads are known as a thoroughly dependable motor —tough on the outside . . . on the inside . . . at the bearings.

BELL AIRCRAFT CORPORATION:

"We've been depending on Tri-Clad* Motors for Ten Years . . ."



This Tri-Clad driven radial drill takes care of most of the large dies for the entire Bell plant. Big dies and bolster plates are drilled and tapped on this machine, a critical part of the Bell operation. Despite continuous use, plant personnel can't remember a single interruption due to Tri-Clad failure!

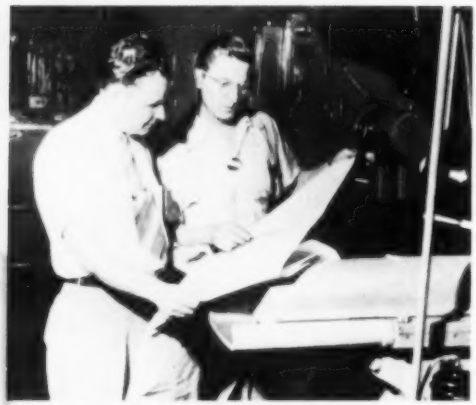
FASTEST BOMBER IN THE WORLD! Jet engine nacelles for the 600-plus miles-per-hour B-47 are being produced at a record-breaking clip in the Bell plant at Buffalo, N. Y. The "Stratojets" represent a major advance in bombardment aircraft.

*Reg. trademark of General Electric Co.

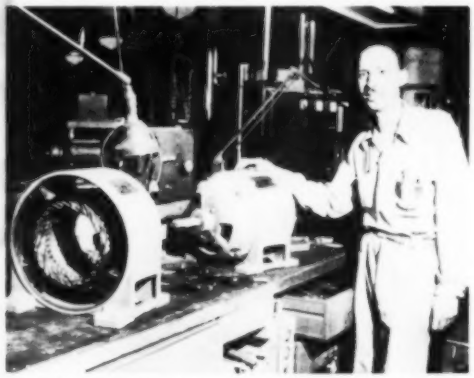
GENERAL ELECTRIC

TRI CLAD MOTORS

Help keep Bell Aircraft production up!

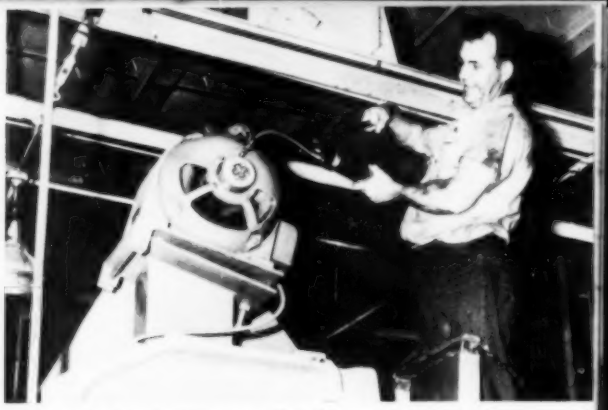


Marvin Limburg (left), Foreman of Bell's Tool and Die Shop, comments, "I don't believe we've ever lost machine time due to breakdown of Tri-Clad motors. And our jig-borers, for example *have been operating around the clock for the last 8 to 10 years.*"

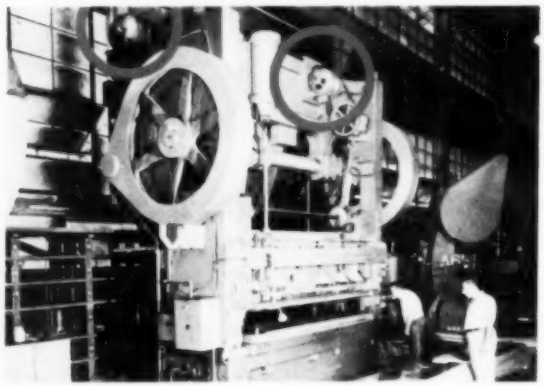


"It's the easiest motor we have to maintain" according to Maxwell Anderson, Crew Chief of Bell's motor repairmen. "There's more working room inside and more room in the slots. It's become a byword with us that if you give a Tri-Clad motor ordinary care you'll never have to worry about maintenance."

TIMELY READING—With every electric motor needed on the line, you'll want a copy of the G-E manual on "How to Maintain Motors and Generators." It's free; just ask for bulletin GET-1202. *Sect. 752-10, General Electric Company, Schenectady 5, N. Y.*



Greasing isn't necessary on a Tri-Clad motor in normal service, but it's always reassuring to know that you *can* lubricate if you so desire, without time-consuming disassembly. The photo shows how easy it is: remove relief plug, attach the grease gun nozzle, squirt—the job is finished.



This huge punch press is an important tool maker. Anton Geiser (right), assistant punch press foreman, says: "I can't recall a single shutdown of this section due to motor failure." Almost all motors in this department are Tri-Clad. This is another Bell Department which has been operating around the clock; cannot afford to lose time because of motor breakdown.

NEW! A Helpful Training Course on Motors!

Everyone concerned with technical training problems will want this new G-E Motor Selection and Application Course. Consists of 9 short, easily understood lessons. Complete kit—slide films, review booklets and instructor's manual—$100.00. Call or write your nearest G-E sales office.

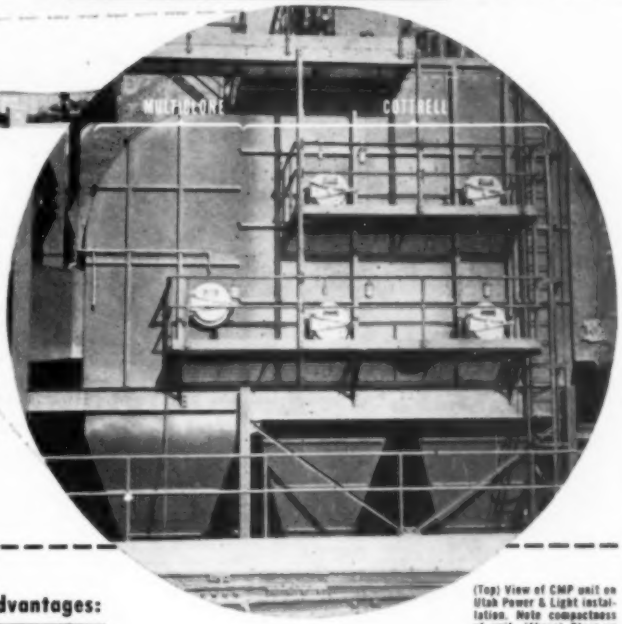
Look at the Scope of this Course

1. Fundamentals of Motors
2. Types of Motors
3. Fundamentals of Selection
4. A-C Induction Motors
5. Single-phase Motors
6. D-C Motors
7. Synchronous Motors
8. Adjustable-speed Drives
9. Gear Motors

GENERAL ELECTRIC

Planning A Fly Ash Recovery Installation?

Consider these important advantages of a WESTERN PRECIPITATION CMP UNIT!



(Top) View of CMP unit on Utah Power & Light installation. Note compactness of unit. (Above) Close-up of same installation.

IF YOU are planning the installation of any type of fly ash recovery equipment—mechanical or electrical—it will pay you to investigate the extra advantages to be gained by installing a CMP Unit designed, engineered and constructed under *one* responsibility by Western Precipitation Corporation—*leaders in both electrical and mechanical recovery fields!*

Combines Mechanical and Electrical Advantages:

A CMP (Combination Multiclone-Cottrell Precipitator) Unit combines—in one compact installation—both mechanical and electrical recovery principles, so that maximum benefit is obtained from the advantages inherent in each method. The MULTICLONE section centrifugally cleans the gases of the larger and heavier fly ash particles (down to a few microns in diameter) . . . and the COTTRELL Precipitator then electrically removes the very small particles remaining in the gases. This combination arrangement has important advantages:

1. Using the MULTICLONE for cleaning out the heavier particles permits the bulk of the recovery operation to be performed with relatively low-cost equipment.

2. Using the COTTRELL for final clean-up insures unusually high recovery efficiency—approaching theoretically perfect, if desired—with a high efficiency, compact Precipitator unit.

3. Each type of unit—MULTICLONE and COTTRELL—can be arranged for its most efficient application. MULTICLONES may be connected to each separate boiler, if desired, and their draft requirement cut out when the boiler is down . . . while a central COTTRELL handles all gases and operates at higher efficiencies, with continued low power cost, when one or more boilers are down.

4. During soot-blowing periods, or while warming up cold boilers, the MULTICLONE efficiency usually increases, preventing overloads of detrimental carbon from reaching the COTTRELL.

Only Western Precipitation Combines Multiclone and Cottrell "Know-How"—In ONE Organization!

A vital factor in obtaining maximum efficiency and economy in CMP installations is the proper balance of mechanical and electrical recovery equipment to the individual requirements of *each* application. Western Precipitation is unique in that it not only pioneered the commercial application of COTTRELL Electrical Precipitators over 43 years ago, but also has been a leader for many years in the *mechanical* recovery field with its widely-recognized MULTICLONE Collectors.

Result—Western Precipitation has the all-important "know-how" and experience in BOTH fields . . . knows from first-hand experience how to fit the *right* equipment in the *right* place, to do *your particular* job . . . and can provide the complete installation under ONE responsibility and ONE overall guarantee!

Let Our Experienced Engineers study your recovery requirements and make recommendations on the equipment best suited to your operations. A wire, phone call or letter to our nearest office places this unique "Know-How" at your service, without obligation!

Send for descriptive literature!

WESTERN Precipitation CORPORATION

ENGINEERS, DESIGNERS & MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

Main Offices: 1052 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA
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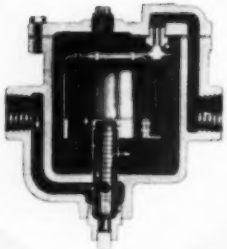
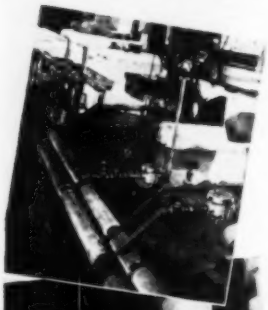
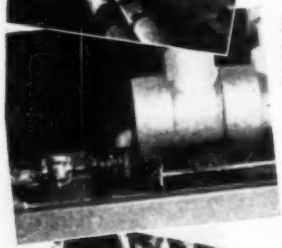
PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL



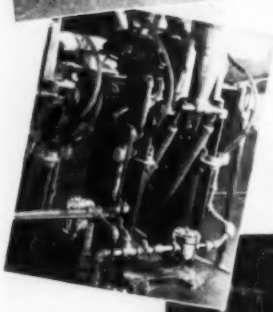
Here is one of the four different traps made by Sarco—the Inverted Bucket Steam Trap with straight-thru connections for easy inspection. Mechanism is attached to the cover; accessible without disturbing pipe connections. Since 1936 all sizes have been factory-equipped with integral strainers at no extra cost. REAL capacities are exceptionally large.



On steam irons for silks, the Sarco steam traps assure absolutely dry steam.



Sarco Steam Traps removing condensate from main steam header at boiler.



Sarco Steam Traps draining collar and cuff ironers.

Sarco Steam Traps keeping drying tumblers free of air and condensate.

KIMBALL LAUNDRY CO.

June 9, 1951

Sarco Company, Inc.
Empire State Building
New York, New York

Gentlemen:

Before standardizing on Sarco Traps, we used many different makes in an attempt to find one that would be suitable from a service and maintenance standpoint.

At the present time our plant is equipped approximately ninety per cent with Sarco traps. This conversion has taken place over the past three years.

Sarco traps are in the truest sense living for us—uninterrupted service with a very minimum maintenance.

Yours very truly,

KIMBALL LAUNDRY COMPANY

By

Assistant

Asst-ek

"uninterrupted service

with a very minimum maintenance"

The letter above speaks for itself. Kimball Laundry is one of the largest west of Chicago. While it was founded in 1886, its equipment today is among the most modern. You too can have "uninterrupted service with a very minimum maintenance," by using

SARCO STEAM TRAPS

Just install one in the toughest spot in your plant and let it prove itself—it will! Sarco makes four distinct *types* of traps and can fit the trap to the job. Our manual "Steam Hook-ups" explains how and provides a convenient selection chart.

Write for your free copy today. 358

SARCO COMPANY, INC.

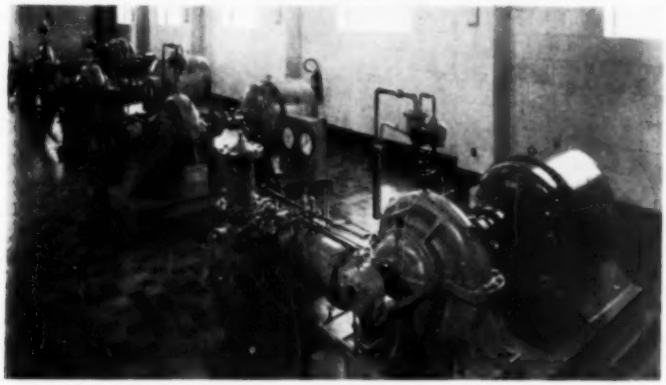
EMPIRE STATE BUILDING, NEW YORK 1, N.Y.
SARCO CANADA LTD., TORONTO 8, ONTARIO

REPRESENTED IN PRINCIPAL CITIES

WORTHINGTON

POINTERS ON PUMPS

Prepared for Industry by Worthington Pump and Machinery Corporation



A Plan That Gets the Most out of Centrifugal Pumps

Easy-To-Install Maintenance Program Means Better Performance, Longer Life

You can't get maximum production when your equipment's operation is constantly interrupted due to breakdowns. Moreover, today's equipment shortages make it increasingly more important that you get all the life you can out of your present machines.

We'd like to suggest a maintenance plan that will help you get the most out of one of your most vital pieces of equipment—centrifugal pumps.

Keep Informative Records

If you haven't already done so, it's a good idea to begin your maintenance plan by setting up a card index file so that you can catalogue each pump in your plant. Each card should contain the following information: plant pump number, size, manufacturer's name and style, serial number, date installed, and any other data which will help you to rapidly locate repair parts lists and manufacturer's parts numbers.

The rest of the card can be divided into a number of columns: Repair Date, Part Affected, Remarks, and Cost. A typical card is shown here.

PUMP MAINTENANCE CARD

PUMP NO.	MANUFACTURER
SIZE	MFGR'S ADDRESS
DATE INSTALLED	MFGR'S SERIAL NO.
LOCATION	MFGR'S STYLE

DATE	PART	REMARKS	COST

If you're careful to enter every maintenance or repair operation on the proper card, it won't be long before each card indicates a particular pattern of maintenance.

Set Up A Maintenance Schedule

Once this pattern is established for all the cards, you can set up a schedule of maintenance points for such items as: packing, greasing or oiling, painting, gasket replacement, and bearing examination. You may find, for example, that a unit or group requires packing maintenance about once every three months, and greasing once every four to six months, etc.

Your next step is to arrange a plant schedule so that a particular pump may be shut down for maintenance at or before these times. Thus you make it possible to do the maintenance work under proper and unhurried conditions to assure maximum conformity of production consistent with long pump life. In addition, examination of the card catalogue will guide operating and maintenance personnel as to quantity of repair parts they should keep on hand.

Make Periodic Inspections Externally

It is considered *inadvisable* to open pumps for inspection.

Rather, recent practice is to let pumps stay on the line until such time as external symptoms indicate overhaul may be required. These symptoms involve either a reduction in effective capacity because of wear at the internal clearance points or mechanical difficulties, such as vibration or noisy operation.

Parts requiring most frequent replacement in centrifugal pumps are: wearing rings, shaft sleeves, packing and bearings.

The most important maintenance point on process pumping equipment is the stuffing box. It must be kept clean, cool, and lubricated—but *packing* is the crucial operation. A good packing method will be discussed in a later edition of *Pointers on Pumps*.

Don't forget the frames, base plates, and supporting parts of your pumps. Good housekeeping often makes it easier to do a good overall maintenance job!

Can We Help You?

Worthington makes more *standard* pumps than any other manufacturer. Don't buy a "special" (at a higher price) without checking to see if Worthington makes it *standard*.

If you *do* need a special, remember Worthington's modern engineering facilities, backed by the longest and broadest experience in the field. Contact our nearest District Office or write to Worthington Pump and Machinery Corporation, Centrifugal Pump Division, Harrison, N. J.

C.2.2

The World's Broadest Line Assures You the Right Pump for Every Job

WORTHINGTON

Centrifugal Pumps

CHAPMAN

Steel Valves Score on all 3 Points

1

CHAPMAN STEEL VALVES have the high precision ratings of custom-made valves — but the economy of production-line manufacture.

2

CHAPMAN STEEL VALVES are made exclusively from quality-controlled steels developed and produced in Chapman's own foundries under control of Chapman's own outstanding metallurgists.

3

CHAPMAN STEEL VALVES are designed to equal or surpass — A.S.A. and A.P.I. Standards in all pressures and temperature ranges.

Be sure to see Chapman first whenever you need steel valves — gate, globe, angle or check. As a result of Chapman's long years of research and experience, they are tops in every respect.

The Chapman Valve
MANUFACTURING COMPANY
INDIAN ORCHARD, MASS.

Timely Comments

Short on Engineers?

POSSIBLE SOLUTIONS to the acute shortage of engineering manpower were discused by Dr. Lee H. Johnson, dean, college of engineering, Tulane University at the recent Southeastern Electric Exchange meeting in New Orleans. The following brief comments, adapted from his talk, deal with a double barreled need—a short range demand for 1952-54 and the needs beyond 1954.

What Can Industry Do?

One possibility is for industry to provide in-service training for present personnel or new personnel. For example, the Bremerton Navy Yard employs a certain number of high school graduates each year, presumably those who are not planning to go or cannot go to college but who have technical interests. The students are employed at the sub-professional level in civil service positions and undertake a program of half-time training in such subjects as drawing, elementary mathematics, physics, or mechanics. This type of in-service training supplies the engineering personnel with a supporting corps of assistants or technicians. Such programs might be suitable in some industries.

Engineers could perform better if working with them were trained technicians to relieve them of routine, time-consuming jobs. Many engineers estimate that at least two or three technicians could be employed to advantage for every engineer.

Technical Institutes

Are such technicians being trained now? There are sources of supply, which are called technical institutes, but they are few in number. There are 142 colleges of engineering which offer accredited curricula and which graduate engineers at this time, but there are only 19 accredited technical institutes producing technicians. More technical institutes are needed, offering training programs of from 18 to 36 months in such things as engineering drawing, building construction, automotive engines, refrigeration and air conditioning, electric motors and generators, industrial electronics, aircraft engines, etc.

Selective Service Regulations

Perhaps the most effective step in meeting the needs for engineers in the next three years lies in revising Selective Service regulations. Significant work has been done by the War Manpower Commission of Engineers Joint Council, together with other agencies, in securing the present deferment regulations for college students. This is a tremendous improvement in the situation which existed last fall. However, it is not enough to meet the current and forthcoming demands for engineers, assuming that the predicted demands will be correct.

The armed forces need college trained engineers as officers in the various branches of the service. The engineering profession must support to the fullest extent the military organization, not only in critical times but also in times of peace. On the other hand, especially in times of critical manpower shortage like this, the armed forces have a corresponding obligation to make the most efficient use of rare materials.

Long Range Demand

All of the suggested solutions for meeting short range needs apply also to long range requirements, assuming that the international situation remains critical. But by far the most significant step to be taken is to increase the number of students who go to college.

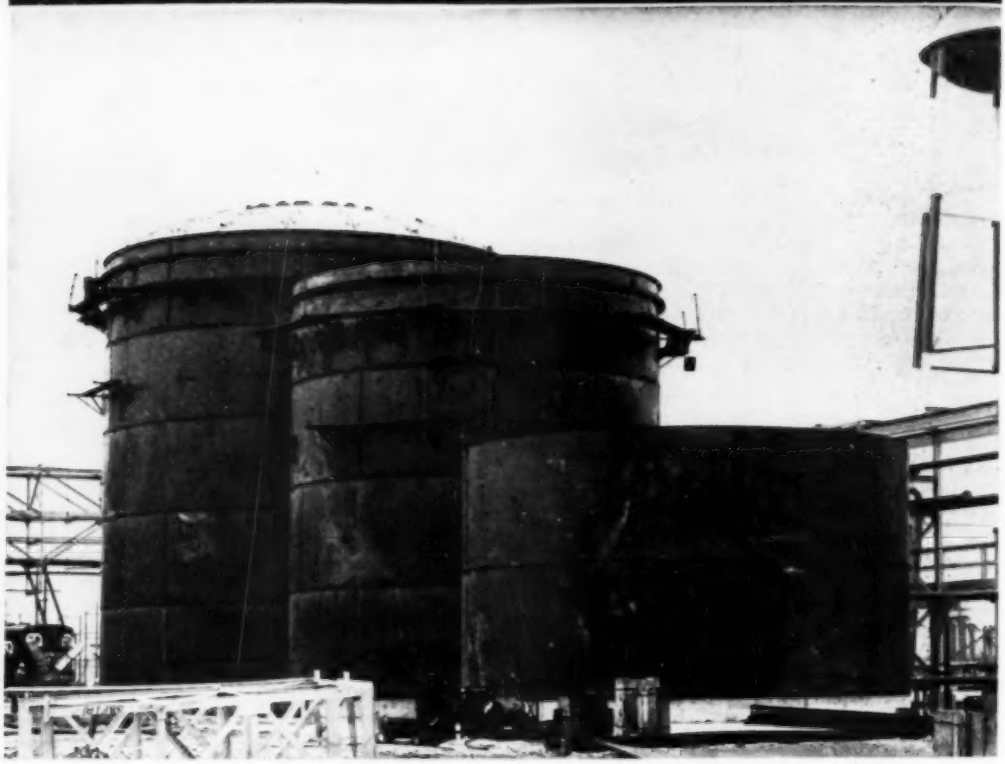
Quoted from Dr. Dael Wolfle, Dr. Johnson emphasized that it is at the point of high school graduation that the biggest single loss of bright students occurs. Only a third of the high school graduates enter college, and of the two-thirds who do not, a large proportion are above average in ability. The attrition among bright students continues in college, for half of the people who enter fail to graduate. Most of the drop-outs, to be sure, are in the lower-ability brackets, but many are brilliant students.

Bright students fail to go to college or quit before graduation if they do go because of lack of interest and lack of money. Of these, lack of interest is the more common one.

We must do better than we have done in the past to identify the brightest youngsters, encourage them to plan on higher education, offer them a chance to work in their chosen fields, and give them financial assistance when necessary.

Industries could aid in developing our human resources, not so much individually but rather by pooling their efforts, say, in a joint commission. Such a commission would arouse an interest in going to college among more bright students and make available financial assistance to those who needed it. The work of the commission could include organizing programs in high schools, on radio, on television, publicizing in other ways the nation's need for college trained manpower, administering funds for part or all-expense scholarships for worthy students, and selecting the students to receive such scholarships.

3 Steps toward Better Tank Construction



Three 40-ft. diameter by 40-ft. Horton umbrella roof tanks nearing completion at a chemical plant.

Welded Steel Tanks Mean Better Chemical Storage

Illustrated above are three Horton flat-bottom welded steel tanks in various stages of construction. Chicago Bridge & Iron Company has since completed the erection of these tanks for a large chemical company in Texas for the storage of ethylene dichloride and ethylene glycol.

Horton tanks offer many advantages for chemical storage: (1) Welded steel construction means tight, durable joints; (2) Smooth surfaces eliminate pockets that breed corrosion; (3) Maintenance is simple, and regular painting keeps Horton tanks in top operating condition.

Remember too, that when corrosion is a problem we are fully equipped to fabricate chemical storage tanks of corrosive resistant alloys and metals. Many chemical companies successfully use tanks made of monel, nickel, aluminum, stainless steel and everdur.

When you specify Horton tanks for chemical storage you assure yourself of the finest in design, fabrication and erection services. Take advantage of this extra margin of quality and put it to work for you on your next storage tank requirements. For information and quotations write our nearest office. There is no obligation on your part.

CHICAGO BRIDGE & IRON COMPANY

Atlanta 3.....2180 Healey Bldg.
Birmingham 1.....1531 North Fiftieth St.
Boston 10.....1044—201 Devonshire St.
Chicago 4.....2107 McCormick Bldg.
Cleveland 15.....2218 Guildhall Bldg.
Detroit 26.....1534 Lafayette Bldg.
Houston 2.....C & I Life Bldg.
Los Angeles 17..1545 General Petroleum Bldg.
New York 6.....3312—165 Broadway Bldg.
Philadelphia 3....1646—1700 Walnut St. Bldg.
Salt Lake City 4.....545 West 17th South St.
San Francisco 4.....1531—200 Bush St.
Seattle 1.....1345 Henry Bldg.
Tulsa 3.....1628 Hunt Bldg.
Washington 6, D. C.....1114 Cafritz Bldg.

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY *and* GREENVILLE, PA. *In Canada*—HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.

Industry Speaks

Benefits of Stabilized Production

Adapted from comments by *E. H. MacNiece*, director of quality control for *Johnson & Johnson*, before the 72nd annual meeting of the A.S.M.E.

BENEFITS to be gained from continuous year-round production are reduced personnel losses and cost of training new employees, more confidence among employees, better community relations, and reduction of the manufacturing facilities that were once required to handle peak production requirements.

Companies that have achieved level production find that it yields substantial benefits in all divisions. The operating effectiveness attained when a definite routine is followed day after day throughout the year is almost unbelievable. Tensions from rush work and interruptions, with the attendant lower quality and lower productivity, do not exist. Employees and their leaders are freed from emotional doubts. They appreciate the freedom of turning out maximum production of top quality without the misgivings that next week or next month will bring cutbacks.

Program Requirements

What may have seemed to be traditional sales seasons may develop into year-round sales if the merchandise is available and sales pressure is maintained. Any sales executive will admit that sales are greater when the merchandise is available for sale than when the supply is limited and subject to allocations and/or late deliveries.

To arrange for deliveries of raw materials in equal increments throughout the year greatly simplifies purchasing. Buyers who must wait until a few months before a season to procure raw-material requirements are often forced to take spot lots on the open market. Yearly contracts for raw materials can generally be effected at better prices and better quality assured.

Level production will not eliminate the need for all the other sound human relations practices, but it certainly solves the majority of those distasteful problems of layoffs, bumping, readjustments and retraining. The whole community looks with pride and respect on those companies in which production is stabilized.

Engineering and research can proceed in an orderly manner if production is stabilized. New and improved processes and products can be introduced after they have been carefully tested.

Capital requirements necessary to carry finished-goods inventories through off-seasons certainly will have to be weighed against capital requirements for facilities capable of peak production. Cost improvements resulting from more effective stable operations may tip the balance in favor of level production, however, some younger companies manufacturing seasonal lines of goods may find that the net working capital necessary to permit it is unavailable and the risk of falling prices too great. As they mature, as world economics stabilize and as tax structures improve, they may reach a position where the survival of the enterprise will not be threatened by larger working capital requirements necessary for stable production.

Belt Conveyors—Bulk Handling Giant

Adapted from comments by *Laurance O. Millard*, assistant general sales manager of *Link-Belt Company*, before the materials handling division, annual meeting, A.S.M.E.

BELT conveyors are capable of transporting tonnages far in excess of any currently practical requirement. Heightened efficiently and broadened versatility of the belt conveyor have been achieved through application of advanced engineering and materials like the new textile and steel reinforced belts, which are four to ten times stronger than their predecessors.

New solutions to the problems of drive motors and power application and more careful consideration of friction factors, slippage and slack are other contributions of mechanical engineers to high performance.

No Loss of Time

Leading all other conveying systems in bulk handling, individual belt conveyor installations in the vital fields of ore and coal mining, stone quarrying, public works, in power plants, steel mills, and at docks and terminals, handle material at rates calculated in millions of tons per year.

Dependable handling of such enormous quantities is at the same time accomplished at inherently low costs, because belt conveyors work continuously, piling up tremendous tonnages without loss of time for empty return trips or loading and unloading delays.

Typical Applications

There is a coal mine-to-preparation plant system more than four miles in length, and at another mine a final-slope belt 60-in. in width having a capacity of 3000 tons per hour. In another installation, a single 1500 hp motor operates the world's highest-lift single conveyor, lifting coal 862 ft. The world's longest single belt is used for loading washed coal into river barges after carrying it 10,900 ft through a mountain from the preparation plant.

In power plants, where present day conditions dictate a coal reserve of up to six month's supply, the flexibility and capacity of belt conveyors are relied on widely for piling and reclaiming the fuel and delivering it to the bunker storage. Such systems are often provided with dust-tight bunker seals, and weights of coal on the moving belt, accurate to ½ of 1 per cent, may automatically be recorded.

Power Modernization Report from Oklahoma Industry

Dewey Portland Cement's Economical and Flexible

Power Expansion

Rewinding two existing generators, installing a new 5,000 kw unit, new switchgear, and using load center distribution solves urgent power supply problem.

Excellent cooperation between construction forces and Dewey engineers minimized shutdown time and production losses. The cement plant operated at full capacity except for a 10 day shutdown.

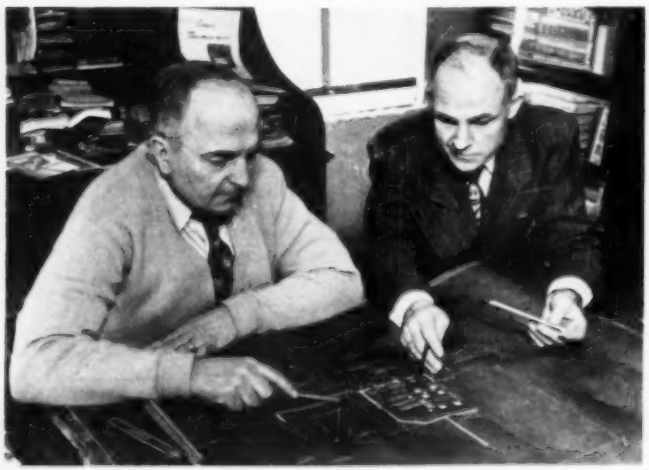
The new power generation and distribution system easily meets current production needs and offers sufficient flexibility for future additions or alterations at minimum cost.

By C. E. KIETZMAN
Assistant Superintendent
Dewey Portland Cement Company
Dewey, Oklahoma

Dewey Portland Cement Company at Dewey, Oklahoma

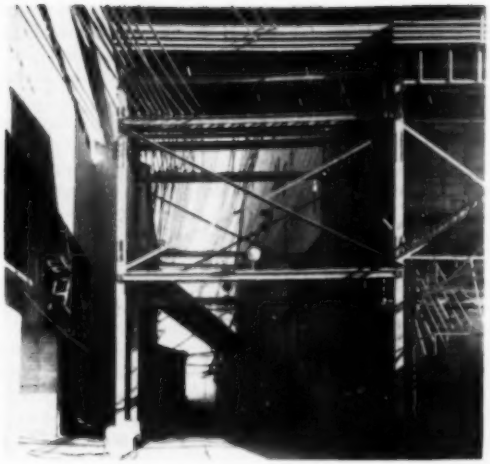
POWER for the Dewey Portland Cement Plant at Dewey, Oklahoma, was supplied from two sources prior to recent completion of a modernization program. Most of the power came from a waste heat steam generating plant operated by the company, and purchased power supplied peak loads and served as standby. The company owned plant included a General Electric, 3000 kw unit and an Allis-Chalmers 3200 kw unit, both generating at 480 volts. Four 1100 hp waste heat boilers that supplied steam to these units operated on waste heat from the cement kilns. Purchased power from Public Service Company of Oklahoma was used only when the steam plant was shut down for annual general repairs, for emergency operations, for peak periods, or when the steam units could not handle all load requirements.

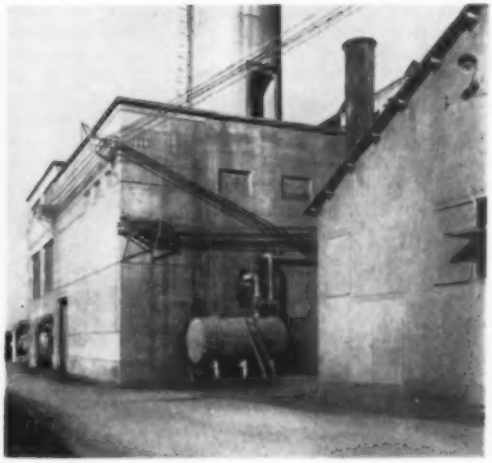
Due to inadequate interrupting capacity of the switchgear, the two power sources were not paralleled. Therefore, whenever purchased power was used at all, it had to supply the entire load of one or more feeder circuits. This



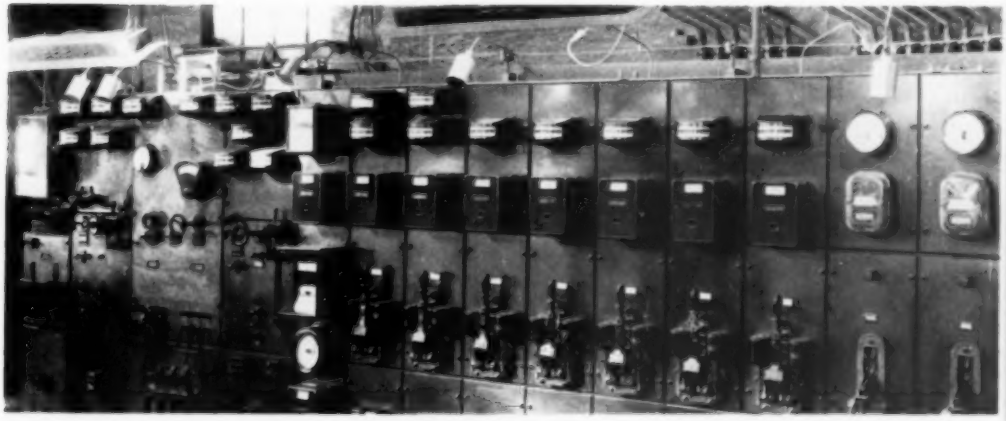
C. E. Kietzman, the author, and *W. F. Hildebrand* (right) of General Electric's Tulsa, Oklahoma, office made a complete power study of the plant.

Mr. Kietzman, formerly with the Lehigh Portland Cement Company, has been assistant superintendent at Dewey since 1940. *W. E. Tyler* is chairman of the board of directors; *D. M. Tyler*, 1st vice-president and general manager.



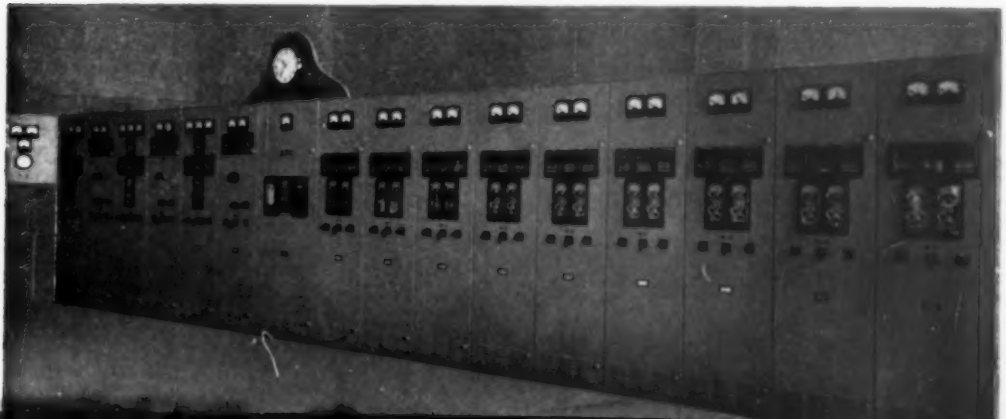


Note the obsolete maze of large cables at the left which were used for low voltage distribution. Power was generated and distributed throughout the plant at 480 volts, 3 phase, 60 cycle. Small cables at the right now distribute power at 4160 volts.



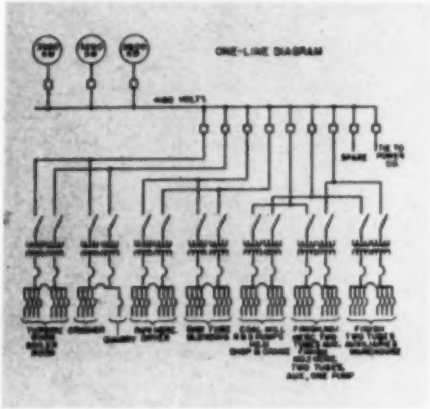
BEFORE—Obsolete switchboard had exposed switches and circuit breakers of inadequate interrupting capacity. Note the large, heavy copper conductors on the wall.

AFTER—General Electric metal-clad switchgear gives adequate protection to personnel and equipment. Completely metal enclosed breakers are rated 5000 v, 1200 amp, 250,000 kva interrupting capacity.

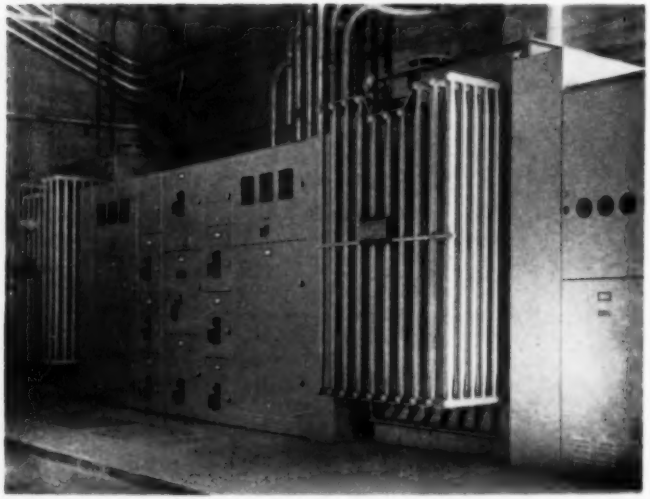


power system operated fairly satisfactorily, but was far from economical.

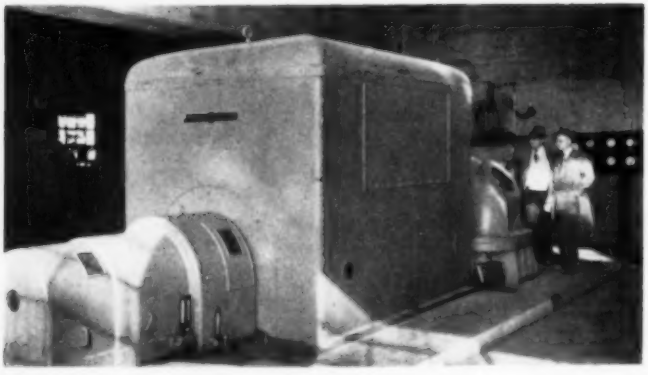
A complete study of the plant was made by the author in cooperation with *W. F. Hildebrand* of the General Electric Company's Tulsa, Oklahoma, office, and *J. M. Glendinning*, General Electric switchgear specialist of the Dallas, Texas, office.



One line diagram of the new load center distribution system. Power is generated at 4160 volts and stepped down to 480 volts near specific loads.



Double-ended load center, G-E unit substation rated 3000 kva and the new 5000 kw, 4160 v, G-E turbine - generator are shown below.



The waste heat supply was found more than adequate to supply the two existing turbines. In fact, when the six kilns were in operation, gases from one were discharged to atmosphere. Thorough investigation indicated that enough waste heat was available to justify an additional generator of 5000 kw capacity.

The study also indicated that when the two existing generators were operating, the short circuit current would be approximately 103,000 amperes, and the momentary current that each switchgear should be capable of withstanding was approximately 165,000 amperes. Therefore, the existing oil circuit breakers were known to be entirely inadequate for the interrupting duty to which they might be subjected.

Fault conditions would be increased to twice the above short circuit ampere values by the addition of the 5,000 kw unit mentioned above. The additional unit was considered necessary to provide for present and future power requirements. Power at that time was generated and distributed through the plant at 480 volts, 3 phase, 60 cycle. The engineers knew that a higher generator voltage was necessary in order to eliminate hazards to personnel and equipment, and to facilitate adding the new generating capacity. Higher voltage was also necessary in order to stay within the economic limits of standard equipment switchgear ratings.

A voltage level of 4160 volts wye was selected instead of 2400 volts, because of the excessive short-time fault currents at 2400 volts, ground fault protection, and savings in primary feeder copper. The estimated cost of rewinding existing generators for either voltage was approximately the same.

Load Center Distribution

Nearly all of the plant motors are operated at 440 volts, and the load areas are too far from the

generating plant to allow economical distribution at 480 volts.

Therefore the load-center distribution system was selected to afford low voltage drop, low IR^2 losses, large blocks of power to concentrated load areas at a higher voltage, small cable sizes, and the elimination of long heavy copper bus runs. The zone placement of double-ended load center units and two sources of power to each unit insures 24-hour-a-day service.

The plant was divided into seven load areas of about the same connected horsepower. Each double-ended load center unit is rated 3000 kva, which is greater than the sum of the connected load. However, in the event of trouble in one transformer or fault in its primary feeder line, its associated transformer is capable of carrying approximately the full load in this area for a short time under emergency conditions.

Standardization played an important role in Dewey's power system modernization. All of the load centers being the same size and rating, permitted standardizing primary switches, transformer sections, main and secondary breakers, secondary bus tie breakers, and all feeder breakers. A one line diagram of the complete system is illustrated.

It was necessary to split two of the load center units in order to place primary power supply nearer to the center of the load area. The secondaries are tied together with proper size cables with normally open tie breakers.

Power Plant

Two existing generating units (one 3000 kw G-E, and one 3200 kw Allis) were completely overhauled, and the generators were converted from 480 volts to 4160 volts by installing new coils and laminations. An exciter was connected to both units through flexible coupling to the rotor shaft.

The new turbine-generator is a 5000 kw, 4160 volt, General Electric unit, which can be synchronized with both of the old units. The 8000 kw capacity (the new G-E and one old unit) provides sufficient energy for present power demands, and matches present boiler capacity.

Power plant switchgear is Type MI-6, vertical lift, metal clad. Distribution switchgear equipment consists of one totalizing panel and nine feeder panels of equal capacity and duplicate equipment. Seven of these panels at present carry the seven duplex load centers, and one is a spare, and one is to be used for a tie-in for outside power. All breakers are rated 5000 v, 1200 amp, 250,000 kva.

The condenser for the 5000 kw turbine is an Ingersoll-Rand twin unit with three horizontal pumps for the circulating water and two vertical pumps for the condensate. Consequently, there is always one standby pump for the circulating water and one for the condensate. Condensate is returned to the boiler and used for feedwater.

The Crosby Construction Company of Chicago were the general contractors on the project, with *Kelso-Burnett Company* of Chicago and *Keener Electric Company* of Bartlesville, Oklahoma sub-contracting the electrical installation. *Houston Pipe & Supply Company* of Houston sub-contracted the setting of the heavy machinery, steam lines, fittings, condenser installations, etc. The Dewey plant force constructed the spray pond and handled miscellaneous underground piping installations.

Other Phases of the Modernization Program

Concrete chimney 250 ft high, 11 ft inside diameter at top. The high temperature flue running under the first pass of the 4 boilers is connected to the chimney at one elevation (lower opening) and excess gases from the 6 kilns when not needed for producing steam, are bypassed into the stack at approximately 1800 F.

Gases from the induced draft fans on the 4 boilers formerly passed through a low steel stack into the atmosphere, but now the gases pass through a steel flue into the chimney at the second opening, about 50 ft higher than the high temperature flue opening, and at about a 90 degree position from the lower opening. Gas

(*Continued on page* 115)

Dewey's new 250 ft stack is lined with fire brick up to 2nd opening where it is tapered off to a 9-in. wall at the top. Air space opening is provided between concrete wall and brick wall, entire height of the chimney. An additional 9-in. target wall is built up inside the regular brick wall for approximately the first 50 ft.

This 9 ft, 6-in. diameter, 90 bbls./day capacity kiln was installed by Dewey's construction and electrical departments. A Buell, 16 cone, cyclone dust collection system is installed between fan and kiln. A Green Fuel Economizer induced draft fan is driven by a G-E 200 hp motor through a Texrope unit. Double inlet fan has a capacity of 142,000 cfm at 495 rpm.

Temco, a large Dallas, Texas, subcontractor, comments on

How to Expand a Plant

By W. A. TWEEDIE
Chief Industrial Engineer
Texas Engineering & Manufacturing Co., Inc.
Dallas, Texas

Problem—*Temco provides flexibility in the prime contractors' scheduling. The prime contractor does as much work as he can and Temco gets what is left over. This excess may be large for one contract and small for another. Temco has to roll with the punch. They have to maintain an orderly layout, yet retain flexibility for rapid expansion.*

Solution—*Expansion takes place into an "easy to move" area. Warehousing or operations involving the minimum of heavy equipment, are placed safely in "expansion areas." A light departmental fabrication operation can be easily relocated. Departmental and interdepartmental layouts, both units and sections, must be fluid.*

LEARNING how to expand plant facilities can be a costly lesson. Industrial salesmen, particularly those dealing in materials handling equipment, can tell you how many plants there are with strange and difficult production or handling problems which are purely the result of growth and expansion without plan. Uncontrolled, unplanned growth is the cancer of industry eating away profits.

It is, of course, impossible to lay down a formula or a set of simple rules to guide every industrial engineer in every size and type of plant when faced with an expansion program. In fact, nothing is more frustrating than a magazine article which reiterates over and over the theme, "Be sure to consider all angles before going ahead," or "Care should be exercised in every approach to the subject." These are mere elaborations of the obvious. The questions still remain to be answered. "*What* angles should be considered?", "*What* is the approach?"

Operation

Here at Texas Engineering and Manufacturing Company, we have been expanding at a rapid rate for about two years. We subcontract for manufacturers of airframes and the size of our contracts depends on the needs of the prime contractor. We are the flexible end of the prime contractors' plants. They are going to do as much work as they can in their own plants—we get what is left over—and this excess may be large for one contract and small for another. We must be able to roll with the punch. Lately, the punches have been heavier and, as a result, we are rolling toward the back door of a plant we once thought was ambitious in size.

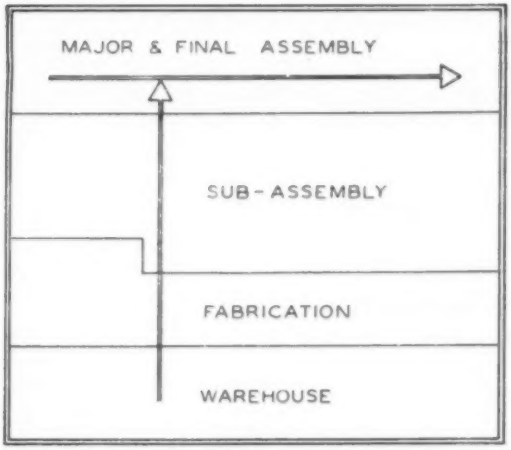
In my office, I have a large drawing of the plant in plan view. In my mind, I see it more as a chess board on which I move not only men, but whole departments of men and their equipment. The object of my game is to make it possible for them to shift about easily from one square to another without upsetting, but rather aiding the overall plan.

Basic Flow

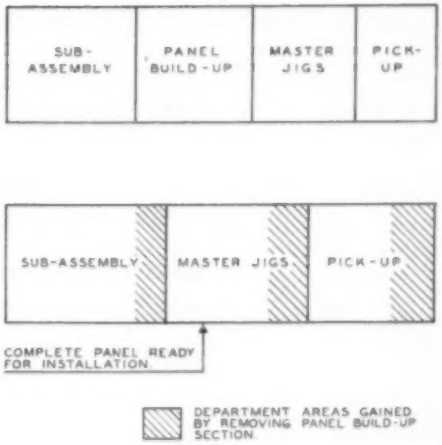
In our plant, just as in every other plant in the country, the object is to bring in raw materials and turn out a finished product. This object may be accomplished in either of two ways or in a combination of both. Straight processing plants, cotton mills for example, take in a raw product and process it until they have changed the raw cotton fiber into yarn or fabric. There is nothing added and no assembly is involved. On the other extreme is the pure assembly plant such as those operated by the automobile manufacturers in various sections of the country. These plants do no manufacturing, they merely assemble the products cast, machined, or woven in other plants. But most factories, ours included, both process and assemble.

In plants of our type, the first problem is that of arranging the departments so that the movement of materials is at a minimum. Ideally, we want our production areas — the areas manufacturing parts—to be located as close as possible to the point where the item being manufactured goes into the assembly line. This means that these manufacturing areas

Mr. Tweedie, author of this discussion on plant layout, was named factory manager of Luscombe Airplane Corporation of Garland, Texas, in December, 1951. He has charge of all manufacturing and supporting operations at this Temco subsidiary.



The object in all plants is to bring in raw materials and turn out a finished product. The majority of plants both process and assemble. Production areas must be located as close as possible to the point where the item being manufactured goes into the assembly line. Flow of materials from warehouse to assembly is basic and must be maintained.



Temco calculates the space currently needed for each manufacturing, sub-assembly and assembly area. Then they assume that production demand is doubled and lengthen the area on the drawing board to accommodate the expansion. Expanded area will naturally overlap areas being used but certain operations can be easily moved.

should be placed in areas along the outside of the plant building. Not only can they then feed into the assembly lines toward the center, but being on the outside, raw materials reach them first. If sub-assembly areas are required, they are laid off perpendicular to the manufacturing areas and lead inward to the assembly lines.

That is simply basic plant layout. Details may vary, but every plant has the same basic problem of getting from the manufacturing area through sub-assembly to assembly. The real problem is to have a layout which can be expanded without upsetting the flow.

Fluid Layout

If a plant has plenty of excess floor space, this is no great problem. However, few plants are this fortunate. Our solution is to first calculate the space currently needed for each manufacturing, sub-assembly and assembly area. Then we assume that our production demand is doubled, and lengthen our area on the drawing board to accommodate the expansion. In doing this, the expanded area will overlap areas being used or planned for other purposes, making such an expansion impossible on the face of it. But, we must remember, our whole plant is doing work that is the result of the prime contractor's overflow and we can carry that idea one step further.

What can we do to maintain an orderly layout, yet still retain the flexibility for expansion we want? It may be possible to arrange the various manufacturing programs so that in the event of increased production, expansion can take place into an "easy to move" area. Operations such as sheet metal sub-assembly, upholstery, or electrical bench work where there is a minimum of heavy equipment involved, can be placed safely in "expansion areas." If it is not possible to layout our manufacturing programs in this manner, we may be able to so arrange our layout so that a warehousing operation is placed in the possible expansion area. Here again by keeping an eye on future possibilities, we can leave ourselves fairly flexible. If it is necessary to move an operation, it is one that can be relocated easily and with minimum cost.

Another method of retaining flexibility is within the departmental layout itself. The department can be arranged in such a manner that expansion can be achieved by taking certain work out of the department. For example, in a Wing Assembly Department, the build-up of individual skin panels can be removed to another area to make room for an expansion of the master assembly jigs. This can be done without expanding the overall departmental area if the department is laid out with this flexibility in mind.

As you can see, the answer to our problem is to keep one end or section of the layout fluid. Then, by playing checkers with easy to move items, area can be made available when, and if, required.

Shifting areas about is not necessarily as simple as it sounds. It is like the housewife rearranging the furniture in the living room. After she gets everything just like she thinks she wants it, she suddenly realizes there is no place for the sofa. Basic flow patterns must be maintained. In shifting about, the movement from manufacturing to sub-assembly to final assembly must not be disturbed. It is possible, in most instances, to maintain a fluid end in each area and still maintain the necessary flow. To date this pattern has allowed us to roll with the punches here at Temco.

Southeastern Electric Exchange's New Orleans meeting features

Industrial Power Trends

Southeastern industrialists report on

New Equipment and Method Trends
Applying Electric Heat to Vibrating Screens
Electric Power in the Textile Industry

Leading Southern industrial and power executives addressed the general sales conference of the *Southeastern Electric Exchange* in New Orleans, October 30-November 2, 1951. Brief adaptations of three of the papers are published, which are of general interest to engineers and production men throughout Southern and Southwestern industry.

New Equipment and Method Trends

Unusual and practical ways of doing the job with moderate labor and material expenditure are receiving wide attention in plant operating improvements.

Mr. Ben Askew

Adapted from the paper "New Power Applications and Equipment" by *Ben Askew*, industrial power specialist of the *Georgia Power Company*, Atlanta, Ga.

IN your plant operations, consider NEMA design F motors, which have a low starting torque with unusually low starting current. For instance, a standard 30 hp, 220 v motor has a normal locked rotor current of 435 amp, while in the Design F motor, it is 270 amp. Its use, particularly on centrifugal equipment, can often allow full voltage starting and save delay and expense in securing reduced voltage starting equipment.

Increased use of "plugging" for quick stopping of machines through short interval reversing of the motor, can speed up production in many cases. This arrangement can be secured with standard control equipment of simple design and has a particularly wide application in the quick stopping of looms in textile mills and in automatic high speed lathe operations.

A cost saving feature which may be applied for short circuit protection of low voltage circuits uses the new high interrupting capacity fuses. Though not recommended in all instances, they have found some application as main supply interruptors in a number of industries. Up to 100,000 amperes interruption is being obtained with low voltage supply.

The use of ignitions for contactors has shown large savings in maintenance costs on heavy equipment such as cranes and derricks, which require excessive starting and stopping. This is simply an adaptation to other electrical equipment of the electronic control used for resistance welders.

Internal Heating

In your plant operating improvements, consider internal heating, where the equipment is energized with low voltage and becomes the heating medium (fluid heating in pipes or drying clay and sand for screening, when the screen acts as the heater, are typical examples). When the amount of heat required has been determined, take the resistance of the equipment to be used as a heater and determine the amount of current and voltage which will be necessary. The safe maximum voltage between conductors or to ground is probably 25 volts. The Underwriters Laboratories are being requested for a ruling in this matter.

Editor's Note — Check "Applying Electric Heat to Vibrating Screens," by J. B. Whitmore of

the Appalachian Electric Power Company and reported in this Industrial Power Trend discussion.

Welding Techniques

Submerged arc welding (where granulated flux pours over the arc and shields it, giving more uniform and sounder weld) is now available for manual operation.

The high efficiency transformer with its low no load losses, has been combined with the metallic direct current rectifier to use a 3 phase supply and deliver d-c, with the resulting welding advantages.

Southern and Southwestern plant engineers should note that the ratings of some welding machines need some explanation in order to adequately supply them with electric service. One manufacturer has an arc welder which is rated for 110 volts and possible service from No. 14 BX or larger, and fused for 30 amperes. They state the maximum ampere output is 80, but information is not available as to the kva the machine will draw from the line, particularly when the arc is first struck. The question of how much welding can be done with 80 amperes is also problematical.

In the shielded arc welder, units are available which use argon instead of helium. This may be of particular value under current emergency conditions.

A small arc welder is available, using only around 800 watts, which fills cracks and holes in iron and steel castings. The electrode "punches" pits and holes full of metal rather than maintaining a steady arc.

In resistance welding the outstanding development is control. It is now possible to gradually increase the current at the point of weld rather than having full voltage all at once. More consistent weld and longer electrode life result.

Engineers should check the unusual characteristics of some of the new smaller resistance welding machines now being sold. It is quite often claimed that the units will weld certain types of material and the kva inrush may be as much as 3½ times the kva rating appearing on the machine. One manufacturer even suggests using 110 volts on a welder whose specifications show short circuit value of 8.8 kva.

Drilling Technique

Units are on the market which operate essentially as arc welding apparatus but are used for drilling holes. A drill press type machine is used and low voltage is applied between what would be a drill and the material. Instead of rotating, the drill machanism vibrates up and down. Using d-c, approximately 200 amp are drawn between the drill point and work. Operation gradually jabs a hole through most any metal.

Miscellaneous Notes

A gas compressor of the rotating type, generally called a rotary compressor, is receiving wide acceptance for compressing all types of gases. It ranges in capacity from 30 to 1600 cfm and pressures from 20 to 120 psi. This machine is normally at least 10 per cent cheaper in first cost than other types and due to operating at higher speeds there will be consequent savings in the cost of the motor. Low maintenance is added value.

The new unit is particularly applicable for pressure boosting of natural gas and propane mixing plants, and where large volumes of high gas or air at high pressures are needed. For pressure higher than 120 lb, the addition of other units is all that is needed.

The electrostatic precipitation equipment field has developed to the point where you can approach the manufacturers for units to handle nearly any type of product. Equipment will handle paper mill wastes, dusts of all types, detearing, paint spraying, deposition of fabrics, as well as air cleaning.

Emphasis is also being placed on the control of static electricity in paper and textile mills. Equipment is available for direct application to the machine, which counteracts the static with positive alternating current charges.

Southern and Southwestern plant engineering personnel desiring additional information on the equipment and method trends discussed, can direct their inquiry to the Editors, Southern Power & Industry, 806 Peachtree St., N. E., Atlanta 5, Ga.

Mr. J. B. Whitmore

Applying Electric Heat to Vibrating Screens

Electrically heated screen installations are applicable to chemical, coal, steel, brick and other industries utilizing screening operations.

Adapted from a paper by *J. B. Whitmore*, division commercial manager, *Appalachian Electric Power Company*, Roanoke, Virginia.

INDUSTRY has been confronted with a major problem in the "blinding" of screens during sizing operations. It has been caused by moisture in the product being screened.

Some plants have installed stor-

age bins to dry the product before screening, with the resulting expenditures in storage facilities. Dust is also created in using the dry product. Employees object, and a considerable amount of the product is lost. Another method employed is to have labor beat the screens to reduce the blinding condition. This results in short screen life and high labor costs.

Electric Heat

The first application of electric heat was to screens used in preparing clay for the manufacture of china. The installation used a 15 kva dry type transformer with primary taps varying the secondary voltage from approximately one volt to six volts to produce a high current necessary for proper heating of the screens. The current is varied depending on the percentage of moisture in the product which ranges, in clay, from approximately 2 to 12 per cent.

Installations

Our Huntington, West Virginia, office began its experiments with a similar application for a local coal company. In coal preparation, blinding of screens can prove a very expensive operation and can materially affect the acceptance of specification coal.

Truax Traer has four ribbon gyrex steel base vibrating screens. Each screen is 12 x 6 ft, consisting of three 4 x 6 ft screen units. Screens are of the double deck type.

A 45 kva dry type single phase transformer was installed to supply the power for heating this screen. A heavy copper bus bar is used from the secondary of the transformer to a point as near the screen as is practicable. Several short heavy welding cables connect to the bus bar on the sides of the screen. These heating cable leads should be as short as possiblle and of the same length.

A Virginia manufacturer of cinder blocks has experienced a similar problem in screening cinders. A 15 kva transformer with a secondary range of from 1½ to 5½ volts is employed. Operation is entirely satisfactory.

Installational Factors

Economics should be studied to determine whether heating is justified. Excessive screen heating will shorten the life of the screen. Heating input should be limited to a point where the screen will be just kept clear.

When screens are kept completely clear the grain size which a given screen opening passes will rise. Therefore, a finer opening screen must be utilized to keep the size of the particles the same as obtained before electrification. The proper wire size in the screen cloth must be selected to obtain economical heating and allow maximum production.

The high currents at low voltage values encountered in the secondary circuits of these installations make it necessary to carefully consider the effect of reactance and resistance.

Care should be used in designing and installing bus and leads to be sure that balanced current paths are provided through these leads; in insulating the screens from surrounding metal objects and in checking the installation so that there will be no danger to life or property.

All of the applications noted have proved satisfactory. They have eliminated the problem of blinding and have reduced the cost of the screening operation by eliminating labor for beating the screens and by increasing production.

The author notes that the W. S. Tyler Company of Cleveland, Ohio, has done considerable work on electric heated screens. A catalog "The Ty Rock Screen No. 65" and a 4 page bulletin "Ty Electric Heated Screens" are available from the manufacturer.

Electric Power in the Textile Industry

The "old" and the "new" (textile and electric power industries) . . equipment flexibility . . plant constructon . . air conditioning . . equipment trends.

Mr. M. Earl Heard

Adapted from the paper "The 'Old' and the 'New'," by *M. Earl Heard*, Vice President in charge of research, *West Point Mfg. Co.*, Shawmut, Alabama

THE textile industry is one of the most highly competitive in the country. If a man is to keep alive in the industry, he has to keep kicking and stay on the move. He must be continually rearranging his processes and production lines in order to get the utmost in efficiency and production

Electric power offers a flexible system. Motors and lights can be placed anywhere so long as they can be fed by electrical power cables. This was not the case with the old rope drive, steam engines, or water wheels. The layout in the old mills was necessarily stable and stagnant because of the excessive expense and difficulty encountered in any major re-

arrangements, due to the line shafting and drive problems.

Modern power distribution has developed an individual drive system throughout the mill. Opening equipment was probably the first to go to individual drives and since then, the weaving and spinning rooms have followed suit, with the card room holding out until now. It is rapidly on its way to becoming individually motorized.

Conditioned Air

Textiles are worked best under suitable atmospheric conditions of moisture, temperature, and cleanliness. Back in 1904 mills used a system of combined humidifying air cleaning, heating, and ventilation. Early attempts at air conditioning were made by wetting down the floors with a hose or by using vapor pots or steam sprays.

The next step was to use evaporative cooling to humidify and reduce the temperature due to the latent heat of vaporization of water. This led to the present systems of atomizing sprays.

It has now been found desirable under high humidity and high temperature conditions to reduce the relative humidity and/or the temperature conditions. This is done by removing water from air by means of mechanical refrigeration.

The textile industry looks upon air conditioning as one of its main operating tools. Refrigeration will come more and more into the picture as we find increased machinery loads. As machine speeds and capacities are increased, these highly concentrated heat loads are constantly adding heat to the air and in many instances the point is reached where it is more economical to refrigerate the air and remove the moisture and drop the temperature than it is to change the air so rapidly in the mill and add moisture to the fresh air.

Windows and Lighting

From the functional standpoint, windows give light and ventilation. However, light and ventilation provided by nature are not always best for use in the textile plant. It is impossible to efficiently ventilate or light the ordinary textile mill by means of natural light from windows or saw-tooth construction.

Daylight does not give the proper level of illumination required by today's standards. Sunshine produces too much glare and if we do have windows, we quite frequently paint them over in order to reduce glare. For around the clock operation it is necessary to provide adequate artificial illumination for second and third shifts.

Fluorescent lighting is the thing in the modern mill. Ordinary standards require 30 to 50 foot candles per square foot and this is most economically obtained from fluorescent fixtures located from 8 to 9 feet above the floor. A number of mills have gone to the cold cathode type of tube.

Roof Construction

Roof construction is an important factor, particularly where high relative humidities are maintained. Exposed structural steel may result in excessive heat loss and condensation will drop back onto the yarn or fabric being handled in the room. It is often quite advisable to insulate the roof with 2 to 3 inches of insulation to protect the roof planking from deterioration due to condensation and/or to prevent moisture from dripping on the work below.

Water or steam power . . . rope drives . . . line shafting

A *first* for the electrical and textile industries was the installation of several 65 hp motors and two 500 kw generators in the Columbia Mills at Columbia, S. C., in 1893.

As plants grew larger, line shafting became increasingly difficult to install and maintain. This was the beginning of the group drive and before long, one motor was driving four frames instead of thirty. Conversion to individual motor drives continued.

At the time of the first electrical application, textile mills were producing less than 40 million dollars worth of goods. We now find the textile industry producing nearly 6 billion in goods and services per year. This great job is done by some 9,000 mills employing a million and a half workers, who are served by some 5 million electric horsepower.

Digest of Equipment Trends in Textile Processes

Anti-friction bearings have been widely applied to textile machinery. Better running machinery makes for better quality. In some cases, this better quality can be obtained at increased speeds.

Electrical heating and drying is not expected to replace steam cans and direct heating systems, but it has definitely been proven to be an advantage on certain applications.

Electric infra-red heating is being used advantageously. High-frequency heating is being used for drying bobbins of yarn which were most difficult to dry by ordinary methods. The heat penetrates or works from the inside out and dries the yarn uniformly and rapidly.

Black infra-red heating units (120-700 F) are usually in the form of resistance heating units buried in a bat or blanket of glass wool fibers with a reflector underneath and a piece of fiberglas duck on top. These heaters are used for curing resins applied to cloth, or in heat setting or drying certain synthetic cloths or yarns. Many resins are cured in 2 or 3 seconds, compared with some 3½ minutes by older methods. Fabric can be cured through a continuous process instead of using the old conventional curing box.

Instrumentation and control developments claim that it is possible to check the temperature of the cloth as it passes through these units and to so adust the heating units and control them so that cloth temperature will not vary more than plus or minus ½ degree F.

Tailor-made individual drives are now made for fly frames, looms, and cards. The card is a low speed, high starting torque drive; the fly frame is a conventional drive except that there should be a slow soft start; loom drives take the most severe beating of any drive. This is a far cry from the old rope drive of 50 years ago. These production units now have individual motors tailor-made for their own characteristics.

This is the three-piece 32 lb wirebound crate that is used by the Stevens Fire Brick Co. of Macon, Georgia, to ship as much as 640 lb of refractories — fire brick and tiles — through the world. The one-piece wirebound "mat" that comprises the four sides of the crate has been partly folded into shape and one end is being placed in position here. It will be held secure by a few nails.

Refractories made from Georgia kaolin are shipped throughout the world by the Stevens Fire Brick Co. Company was established in Macon, Georgia in 1865. Shipping fire brick, tile, and other refractories presents considerable problems because of their weight, the large numbers in which they are used, and their susceptibility to breakage and chipping.

Georgia refractory manufacturer reports wirebound crates

Cut Shipping Costs

lower packing costs . . . . . less shipping damage

FOR many years the Stevens Fire Brick Co. of Macon, Georgia, packed its refractories for export in heavy wooden crates that it made itself. This proved to be an uneconomical and time-consuming process that failed to provide complete protection against damage during shipment. Instances of container failure were frequent.

About two years ago, company officials and wirebound shipping container engineers achieved a wirebound crate that not only has slashed packing costs by at least one-fourth, but has also eliminated container failure and damage during shipment.

The 32 lb wirebound crate now in use carries as much as 640 lb of refractories, a tare weight ratio of only five per cent of gross

Refractories being packed, fire brick or tile, are brought by wheelbarrow or lift-truck pallets from storage areas to the packing area. Crate consists of only three pieces — the two ends and the one-piece wirebound "mat" that comprises the four sides. "Mats" and crate ends are stacked ceiling-high in a minimum of floor space before use. When needed they are assembled in only a few minutes by folding the wirebound "mat" into shape around the ends and securing them with a few nails.

Refractories are laid in a crate in a tight pattern so they cannot shift. Channels between tiles, etc., are filled with straw and lumber as further protection against shifting and damage. Less than eight man-minutes have been required for the actual packing, including crate-assembling.

weight. Instead of making the crate conform to the load, as was frequently the experience when Stevens made its own crates, the load now is made to conform to the pre-fabricated wirebound crate. Scrap wood and straw are used when necessary to fill empty spaces that result from packing odd-shaped refractories.

Phases of a typical container assembly and packing operation are illustrated. After whatever interior packing is required has been placed, the crate is closed quickly and easily, simply by folding shut the top and engaging and twisting opposing ends of binding wires where the two ends of the "mat" meet to form an edge of the crate.

The compactness of the load, plus the high resiliency and strength of the wirebound crate, combine to protect the refractories against damage from shipping shocks, jars, or rough handling. Only one complaint of shipping damage, and that not because of cointainer failure, has been received by the company since it converted to the use of the wirebound crates.

Controlling equipment vibration with

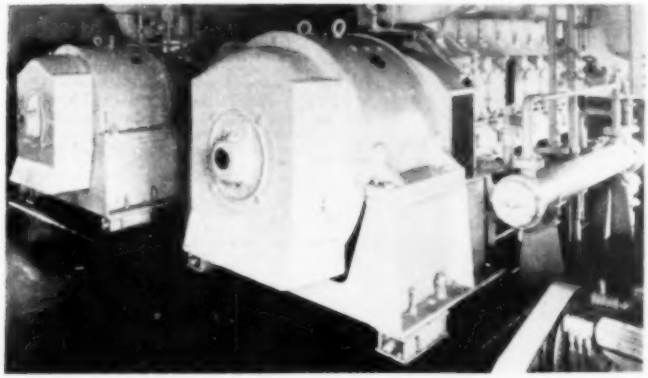
Spring Type

Vibration Isolators

What they are: *Spring isolators may contain from one to nine springs of hard-drawn tempered crucible steel. They are interchangeable and come in different lengths to provide a load range from 50 to 17,000 lb per unit. Resilient snubbers inside the steel housing are adjusted by bolts. For single spring units the snubbing pressure is adjusted by a vertical bolt, which raises or lowers the top plate. There is an adjusting bolt at each end of the isolator on the large sizes.*

How they work: *Machine to be isolated is attached to the top plate by an adjusting bolt passing through the machine base. This transfers the load to the springs by bearing on the spring compression plate. Bolt is also used to level the machine. Weight of the machine compresses the springs. Top plate is then raised back to its proper operating height by turning the adjusting bolt. Isolators can be cemented to the floor when bolts are undesirable. Standard mountings provide for deflection up to 1½-in.*

Two Nordberg 6 cylinder, 4 cycle, 250 kw Diesel-generator sets on an U. S. Engineers mattress laying barge in operation on the Mississippi river. Units are mounted on heavy duty spring isolators having extreme horizontal thrust resistance. Mountings prevent vibration and noise transmission, absorb shocks, and reduce maintenance costs.

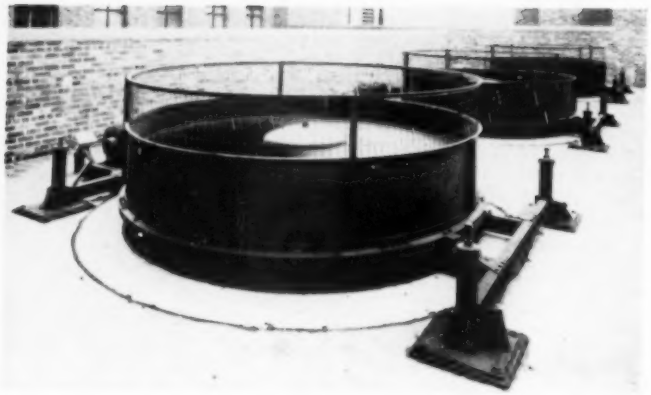


By FRANCIS A. WESTBROOK

photos courtesy The Korfund Company

BY adequately controlling equipment vibration, it is possible to reduce the cost of foundations (sometimes by as much as 25 per cent), to place machines on floors of lighter construction, to operate at higher speeds with maximum efficiency, to increase machine life, to cut maintenance costs, and to retard the deterioration of building structures which might be otherwise damaged.

Improved plant layout is also possible. By resiliently mounting precision production and inspection equipment, it is often practicable to locate them adjacent to



Three Marley cooling tower fans on the roof of Humble Oil & Refining Company's office building in Houston, Texas. Long steel springs inside Vibro-Isolators prevent transmission of vibration at low fan rpm as well as the higher frequency vibrations. Horizontal and vertical snubbers control starting torque.

vibration producing equipment, thus promoting straight-line production and eliminating handling.

Better working conditions exist where vibration is controlled. Noise causes nervous and physical fatigue, a high contributor to inefficiency and accidents.

Although there are several methods of controlling vibration in the industrial plant, this discussion is confined to the use of steel spring isolators. Several specific applicational case histories from Southern and Southwestern industrial plants and large office buildings are illustrated. Others are briefly enumerated.

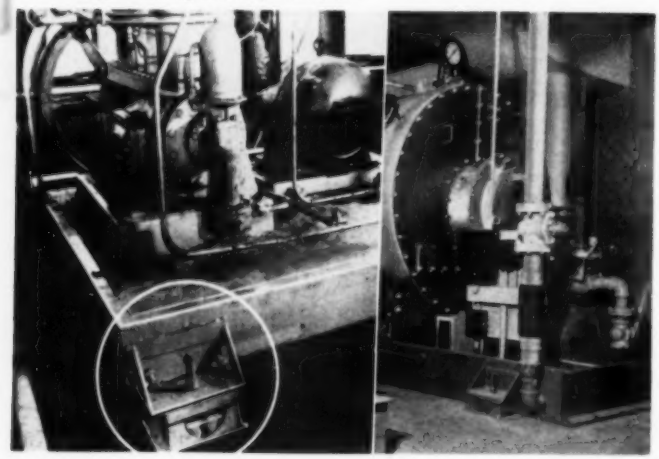
An interesting application involved the installation of two heavy duty Ingersoll-Rand air compressors in the new science building of the University of Texas. Vibration control was necessary in order that delicate laboratory equipment in the same building would not be affected. Excellent results were obtained by using long spring isolators with vertical and horizontal snubbers.

About two years ago the Intercontinent Aircraft Company of Miami, Florida, installed a 66 x 48 Cecostamp. Plant engineers noted that the piles under the foundation were settling under the impact blows of the hammer. This also transmitted vibrations to the building structure. A new foundation was constructed and the Cecostamp was mounted on steel spring vibration isolators, which eliminated the difficulty.

A large Bliss production press adjacent to the general offices of the Hunter Fan & Ventilating Company in Memphis, Tennessee, was very troublesome in respect to vibration and noise. When the press was in operation, it was impossible for the office workers to carry on telephone conversations and working conditions were unsatisfactory. By mounting the press on spring vibration isolators, the noise level was lowered below that of machine shop equipment and other surrounding noises.

Spring type vibration isolators are also used extensively in the City National Bank building in Houston, Texas. A ventilating fan installation, on a light-weight upper floor, was made highly vibration and noise-free by mounting the equipment on a concrete slab supported by spring isolators. The Korfund units provide isolation of vibration due to mechanical unbalance at fan rpm as well as the higher frequency vibration usually controlled by conventional fan bases.

Photos below show a four cylinder Carrier compressor installed on the third floor of the S. H. Kress & Co., Brownsville, Texas and one of two 200 hp Cleaver-Brooks gas fired boilers on the 20th floor of the First National Bank building in Tulsa, Oklahoma.



Vibration control was extremely important in these two large buildings. The wooden floor in the Brownsville, Texas building necessitated a practically noise and vibration free installation. Compressor and motor are mounted on a heavy concrete slab set on steel spring isolators. Latter are supported on two 12-in. I beams resting on the center beam and outer wall of the building. Method of vibration control is so effective that in the office directly below, it is impossible to tell when the equipment is operating.

Boiler room of the $6 million First National Bank building in Tulsa is on the 20th floor. There, two 200 hp Cleaver-Brooks gas fired boilers are installed along with elevator equipment and other major mechanical units. This saves valuable basement space for vaults and storage. Partial view of the boiler room shows spring type vibration isolators.

Gas Turbines for Pipeline Pumping

Gas transported through pipelines to be doubled in 10-20 years . . addition of 4,000,000 compressor horsepower needed to handle increase . . gas turbine ideal drive.

By T. J. PUTZ*

PRINCIPAL savings effected through the use of gas turbines in the major gas transmission systems in lines 20-in. and larger in diameter, will be in the form of reduced capital investment for stations and lines, and a lower cost per unit of gas transported, as compared to gas engine driven reciprocating equipment. Additional advantages will arise from station simplicity, freedom from large water supply problems, reduced maintenance and ease of adaptation for remote control or unattended operation.

In addition, the gas turbine's characteristic of increasing power with low ambients gives it extra rating in the winter months when the demand for gas is greatest. The overall suitability of the characteristics of the gas turbine centrifugal compressor combination of high flow, low pressure ratio makes it ideal in booster service.

To these advantages we can add the probability that owing to restrictions on the use of steel, emphasis will be given to increasing the capacity of existing lines by adding boosters in intermediate stations. The extent to which the gas turbine will capture this market for which it is ideally suited, is dependent on its acceptance by operating companies as a reliable unit.

Increasing Importance

The development of long, large gas transmission pipelines which carry natural gas from the field to the market have made this fuel an important factor in applying the energy requirements of the United States. The present mileage of main gas transmission pipelines in the United States is approximately 100,000 miles with an installed compressor horsepower of approximately three and one-half million. Currently there are over 17,000 miles of gas pipelines 25-in. and above, either installed or authorized.

The current total annual consumption of natural gas in the United States is now over five trillion cubic feet, not counting that used for repressurizing, field fuel and losses. Approximately 35 per cent of this gas was used in refineries and in producing carbon black. The other 65 per cent is pipeline gas. Various authorities have estimated that the amount of gas transported through pipelines will be doubled in the next 10 to 20 years. To handle this increase, a conservative estimate shows that an addition of 4,000,000 compressor horsepower will be needed.

Centrifugal Compressors

The gas turbine, which produces its power rating using the fuel in the gas line, is an ideal drive for centrifugal pipeline compressors. It can be developed in units of large horsepower rating having relatively high rotative speeds and with the speed load flexibility necessary to take care of large pipeline flow variations.

The simple, single shaft gas turbine unit is ideal as a booster in locations where great flexibility is not required and its use is restricted to taking care of peak loads. Where more flexibility is needed to take care of large pipeline flow variations, the dual shaft gas turbine is required. With the addition of a regenerator, this unit becomes competitive on a fuel and lubricating oil cost basis with conventional direct drive reciprocating gas engine units.

Unit in Arkansas

While a large number of gas turbine driven centrifugal compressor units have been reported sold, as of last fall, there was only one in actual operation in pipeline pumping. In May, 1949, a Westinghouse unit was placed in service—an 1800 hp gas turbine driving an Ingersoll-Rand direct-connected centrifugal gas compressor—in a test station on a natural gas line at Wilmar, Ark. This was the first such installation in the world and the first industrial gas turbine in the United States operating with natural gas fuel.

The experience gained from this installation has proven that this type of gas turbine is ideal for booster service. The simplicity and small size allows for a simple low cost station, and the unit can readily be moved to various locations. It can be shut down for extended periods without the expense of providing special protection and can be later restarted in an exceedingly short period of time without difficulty.

1800 hp Unit

Based on the experience gained with the 1800 horsepower simple, single shaft unit and the results of detailed studies of main transmission line pumping requirements, Westinghouse has designed and is building a 5000 hp dual shaft gas turbine with regenerator.

*Abstracted from a paper presented at the annual meeting of the American Society of Mechanical Engineers, at Atlantic City, Nov. 26, 1951. Mr. Putz is manager of the gas turbine engineering division of Westinghouse Electric Corporation, Lester, Pa.

ELECTRICITY and ELECTRIC POWER

Part 1—Volts, Amperes and Watts

By ROY W. WAGES
Division Industrial Power Engineer
Georgia Power Company, Columbus, Georgia

MR. WAGES has had long experience in helping his customers to understand and use the electricity his company sells. He is here giving all SPI readers the benefit of his daily question and answer sessions with men that use electricity for productive power in their plants.

Mr. Wages has been associated with the operating and industrial power departments of the Georgia Power Company, since graduation from the Alabama Polytechnic Institute in 1933. After serving as Lt. Colonel, Field Artillery from 1940-46, he assumed his present position as Division Industrial Power Engineer in the Columbus, Georgia, office.

Many plant men work with electricity every day and yet don't know quite enough about it to get the most out of it. The purpose of this series of articles is to explain the fundamentals of electricity in a way the plant man can understand and use to his own advantage.

INDUSTRIAL plant mechanics, electricians, mechanical supervisors and maintenance foremen are constantly seeking information about electricity and electric power. Electric power is the force that keeps their plants in production. But they want this technical information stripped of all its mumbo-jumbo and gobble-de-gook and, instead, presented in ordinary, every day terminology. And well they should, too; for they have little time to devote to the interpretation of complicated explanations. A doctor of medicine might well tell another doctor that he has an inflammation of the upper respiratory system; but he certainly would not use that term to most people. Instead he would call that ailment a bad cold. In like manner, stripping technical discussions of high-sounding words will lead to a better understanding by many of the men in the plant that use electricity as an everyday tool.

What is Electricity?

So, here we go: First of all, what is ELECTRICITY? We know that it can't be seen; nor heard; nor smelled. But it can be felt. What is electricity? I don't know—but perhaps the dictionary can help. *Webster* defines electricity as "an imponderable and invisible agency, capable under various circumstances of producing light, heat, chemical decomposition and other physical phenomena." "An imponderable and invisible agency . . ." Not bad; but wait until you read this one: *The American Standard Definitions of Electrical Terms* states that "Electricity is a physical agent pervading the atomic structure of matter and characterized by being separable, by the expenditure of energy, into two components designated as positive and negative electricity, in which state the electricity possesses recoverable energy."

Both definitions are the works of men outstanding in their respective fields and can be accepted as "official." But for most of us perhaps it would be better to think of electricity as a force that we cannot quite define but one that we can put to work for us and which, if properly applied and controlled, will be our servant of "many hands and eyes."

Over the years we have learned a great deal about the behavior of electricity; for example, how it reacts under different circumstances and how it may be controlled, measured and applied. So while we don't know exactly what electricity is, at least we have learned, or made up, a set of rules for its behavior.

Before we can intelligently talk about how electricity can be controlled, measured and applied, we will have to learn, or understand, the meaning of some words that have been made up to define certain properties or features of electricity. These words deal primarily with the measurement and results of putting electricity, or electric power to work.

If I were to ask you to define the measurement "foot," you would probably say: "oh, a foot is twelve inches." I could then ask, 'What's an inch?" There are several answers you could give me which I might, or might not, understand. But if you held up your thumb and fore-finger and said: "Why, an inch is a distance about that long," you would have immediately conveyed to my mind something that it could

WORDS ARE IMPORTANT

All industrial workers know a great many words that are specific to their trades. They have to know and understand these words, otherwise they could not work effectively together and get things done.

The specialized languages of most trades are accepted without question and do not seem to give anyone much trouble—But electricity is different.

For some reason electricity seems to be mysterious. Few people understand it, and a great many do not want to understand it. But there really is no mystery. About 10 or 15 special words seem to be all that are essential. Learn these few words and their simple definitions; then the mystery disappears.

Sounds easy, and is easy. Don't let 10 little words prevent your gaining knowledge that can greatly help you with your work.

readily grasp and understand. Armed with that knowledge, I would not have any difficulty understanding the meaning of foot, yard, mile or any other unit of linear measure. Thus inch, foot, yard and mile could be resolved into familiar terms. After that explanation of those terms if you were to speak of centimeters or millimeters, I would again be confused until you explained what distance a centimeter is, or what it means, in terms of an inch. Then I would understand because already you had given me a very definite description of an inch.

If you were to ask me how fast a certain ship, that we could see on the water, was moving, I would reply, for instance, "ten miles per hour." But if you were to ask a sailor that same question he would reply, "she's making about ten knots." The sailor's reply wouldn't mean much to you unless you knew that a "knot" is a term that means a velocity of "one nautical mile per hour." But once that definition had been given you, you would not be confused by the word "knot." In other words, you could resolve "knot" into something that conveyed a definite picture of speed to your mind: miles per hour.

So it is with the words of any particular trade: they have to be "translated" before some one in another trade can understand them. If a lawyer, for example, told you that he was preparing a writ of mandamus you might have no idea of what the paper was about. But if he told you he was preparing an argument for presentation at a trial to force a public official to carry out the duties of the office concerned, then you would have an understanding of what the lawyer was doing.

So it is with us in the electrical field. We use words that have a "foreign" sound to most of the other types of workers, and sometimes even to ourselves; for many times our own concept of the meaning of the words is hazy.

Let's examine a few of our more widely used electrical words and terms.

Weight and Force

The electrical words you would like to learn first are volt, ampere and ohm. But we cannot just jump right in and give you a quick definition. In fact the definition of each one depends on the other two. The three go together; no one of them can accomplish anything without the other two.

For example consider the ampere alone. Where did we get such a word as this? And what, exactly, does it mean? Let's consult the dictionary again. *Webster* says that an ampere is "the practical unit of measurement of electric current, equal to the amount of current passing though a circuit whose resistance is one ohm, under an electromotive force of one volt." That definition, at this moment, doesn't help much for it immediately brings up the question, "what is a volt?" And then another question, "what is an ohm?"

So you see, in order to get a clear picture of the terms volt, ampere, and ohm, we have to dig a little deeper and learn the meaning of some more words.

Let's go back to our discussion of an inch. We, all of us, know that an inch is a linear measurement of a distance of this magnitude

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With that as a starter, let's define the word "centimeter." A centimeter is equal to 0.3937 inch; or, a line about this long ——.

Now, let's suppose that we take a piece of clear plastic and cut out six pieces one centimeter square, and glue the six sides together to form a cube. We would then have one cubic centimeter. Now, if we filled that cube with distilled water, we would have a weight, neglecting the weight of the plastic itself, of one GRAM. Thus we can now add GRAM to our list of words.

If you took that cubic centimeter of water, which weighs one GRAM, and lifted it at the rate of one centimeter per second, you would be exerting a force of one DYNE. So now we understand another word.

If we lift an object a certain distance we are said to be doing work; and work in our trade is generally measured in foot-pounds (the weight times the distance we lift the weight), and if we accomplish 33,000 of these foot-pounds in the time of a minute, we are exerting one horsepower, which is the *rate* of doing work. The same amount of work exerted in any other manner is still a horsepower—regardless of whether we lift a weight or push a load, or turn a crank.

Now, let's go back to our GRAM and DYNE and CENTIMETER.

The **work** done by a force of one dyne through a distance of one centimeter is called an **ERG.** Strange words; but if we study them for a few minutes, we will begin to get some idea of what they mean. With ERG added to our list, we can return to the more familiar words VOLT, AMPERE and OHM.

Volt:

We all know that we use electricity primarily to do MECHANICAL work. That is, we convert the electrical energy to some form of mechanical energy. Now, we can define VOLT so as to answer the question, "What is a volt?"

A VOLT is the force in an elec-

tric circuit that causes the electric energy in that circuit to be converted into other forms of energy at the rate of one hundred million ergs per second.

Ergs are so small that the word is not used much except for purposes of definition, after we have used it to define and understand the more practical terms, we can forget it. Perhaps not one electrical engineer in five could give you a clear definition of erg right now. But the beginner can make good use of it in learning to understand the practical every-day terms.

Ampere:

Well, having determined what a volt is, namely, a "force" that converts electric energy to some other form of energy at a certain specified rate, we need to get a name for the "flow" of electricity. That, you remember, is AMPERE. But before we can picture what an ampere is, we have to define OHM. An "ohm" is the electrical resistance at zero degrees centigrade of a column of mercury of uniform cross-section, having a length of 106.3 centimeters and a mass of 14.45 grams.

An AMPERE of electric current is that amount of current that will flow in a circuit of a resistance of one OHM under a force of one VOLT.

How did we get such words? No special reason, I guess, other than to honor certain men who were pioneers in the field.

The word "ampere" was so-called after a French scientist named Andre Ampere who lived from 1775 to 1836. Volt was taken from the name of a physicist, A. Volta, who lived from 1745 to 1827. Ohm is in honor of Dr. G. S. Ohm, a German physicist who lived from 1787 to 1854.

That is a brief how and why, or rather why and how of the three most important words of an electrician's trade.

Electrical Power

Electricity, when harnessed and put to work in an industrial plant, is usually spoken of as "Electric Power." There's nothing mysterious about putting electricity to work. Let's think of it like this:

Over here at Point (A) we have a source of electricity (that source may be a generator in the plant or the bus bar of the substation belonging to the local utility); and over there at Point (B) we have a motor that we want to make turn some machine. Well, the accepted medium for transporting the electricity from one point to another is copper wire. So, we will connect one copper wire from the source to the motor, for the electricity to ride over on; and another wire from the motor to the source for it to get back. These wires "conduct" the electricity from one point to another and, because of that function, they are sometimes called "conductors."

A plant electrician asked me why it was that, if the motor or light bulb used, or consumed, electricity, *TWO* wires had to be used instead of one. He wasn't trying to be funny—he said that he could never quite get it through his head as to why. That was a tough question. And, without launching into a long, befuddled theoretical discussion, I told him to try to picture the process like this:

The "something" that the motor or light bulb used up was electric current that had to be pushed from the source to the motor or bulb by some volts (the "force" discussed previously) and that the volts had to have some way of getting back to the source to pick up another batch of current to keep the motor turning or the light burning. You could almost think of the wire circuit as a continuous belt conveyor of power.

That explanation would, perhaps, not be accepted by a lot of people but it helped Tom to picture in his mind what was taking place in the motor or light bulb. It also helped him to an understanding of "phases" which we will discuss later.

So, there we have the picture of a volt pushing an ampere along a wire to the device that is going to consume the current.

And that brings us up to another important step in our discussion.

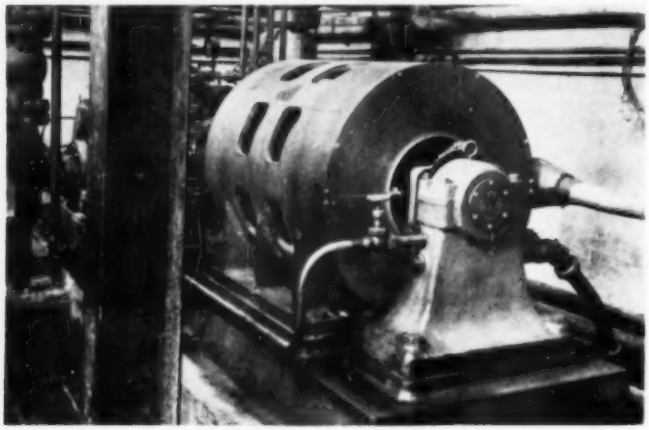
Kilowatt:

The product of that volt and that ampere (the force times the current) will give us the POWER produced by the pair. That is, VOLTS times AMPERES equals WATTS. Well, what's a WATT?

Remember our discussing ERGS a while back? Well, a WATT is equal to 10,000,000 ergs per second; it becomes, therefore, a unit of power. Where did we get the word WATT? Just like we did ampere and volt: it was borrowed from a man's name—James Watt, the man who invented the steam engine. And, while we're on the subject, file it away in your head that 746 of these WATTS equals one horsepower, a more familiar term to most of us.

A closely related word that we hear more often than WATTS is KILOWATTS. KILO is a word we adopted from the Greek language

VOLTS and AMPERES team up to overcome resistance (OHMS) and deliver the necessary power (KILOWATTS) to make this motor work. How all of this is done will be explained in this series of articles.



and means "one thousand." Thus, a KILOWATT is one thousand watts.

Now we can give a formula showing the relationship between volts, amperes and watts. If we let *I* stand for the current (amperes) and *E* stand for volts and *W* stand for watts, we can say that:

$$I \times E = W$$

That is not exactly true for alternating current; but let's accept it as being true until we start discussing power factor in a later installment of this series. Otherwise, we will turn a simple statement into a complicated one. It is true for direct current.

Phase

Let 's digress a moment and discuss phases. Nearly all of us know that today most automobiles have engines with either six or eight cylinders and, perhaps, more have six-cylinder engines than have eight-cylindered engines. Not too many years ago there were automobiles that had one cylinder, two cylinders and four cylinders. The number of cylinders did not necessarily prescribe the horsepower rating of the automobile. That is to say, a four cylindered car could be rated at 100 hp just as well as a six-cylindered car could be rated at 100 hp, or an eight-cylindered car. The number of cylinders prescribed the distribution of power rather than the quantity of power.

By the same token, in the electric motor field we can, and do, have 3 hp single-phase motors as well as 3 hp three-phase motors. At one time, six-phase current was in use. But, like the automobile that finally standardized on the six-cylinder engine and the eight-cylinder engine, the electric manufacturers standardized on single-phase equipment and three-phase equipment.

"Phase," of itself, does not determine the power. A 5 hp single-phase motor is just as strong as a 5 hp three-phase motor. "Phase" in an electric device, like cylinders in a mechanical device, denotes "sequence of power" or a "spreading-out" of power rather than a total quantity of power. By the term "three-phase" is meant three separate and distinct current and voltage combinations melded into one power system.

The resultant power delivered by a three-phase system, neglecting power factor is

$$W = \sqrt{3}\, E\, I$$

not $3\,E\,I$. The reason being, briefly, that the current and voltage components do not exactly "pull" in the same direction. We will discuss this in more detail in a later chapter of this electric power series.

The principal thing to keep in mind right now is that

Watts = Volts times Amperes.

Some of the ways and wherefores that are used to conduct the electricity to the point where we want it will be discussed in the chapter on Power Distribution.

EDITORS NOTE:

At this point the reader should be able to define and understand the terms: volt, ampere, ohm, watt, and kilowatt. If he cannot do so, he should reread this article, and perhaps get a little direct help from someone that knows. He will certainly have to understand these words if he is to get anywhere in his effort to learn what he needs to know about electricity. There are not but about 10 or 12 such basic words in the practical electrician's language—But he must know them well.

Petroleum Electric Power Assoc. Names 1952 Board of Directors

Here are the new 1952 Board of Directors for the *Petroleum Electric Power Association* who were elected at the recent 23rd anniversary meeting in Houston, Texas. P.E.P.A. is an organization of electric power companies formed for the purpose of rendering greater service, through cooperative effort, to the petroleum industry.

Seated in the usual order: *Fred B. Clark*, Arkansas Power & Light Co., El Dorado, Arkansas; *W. L. Pearson*, Southwestern Public Service Company, Lubbock, Texas; *O. J. Frandsen*, Public Service Company of Oklahoma, Tulsa, Oklahoma; *J. W. Lambert*, Southwestern Public Service Company, Borger, Texas; and *T. E. Graham*, Oklahoma Gas and Electric Co., Oklahoma City, Oklahoma.

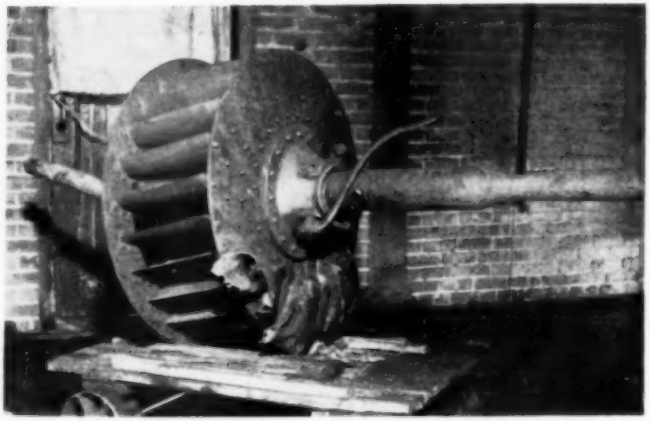
Standing: *R. H. Crossman, Jr.*, Houston Lighting and Power Co., Houston, Texas; *W. M. Larkin*, Gulf States Utilities Co., Lake Charles, La.; *J. E. Moody*, Southwestern Gas and Electric Co., Shreveport, La.; *D. S. Coffman*, Texas Power and Light Co., Dallas, Texas; and *Ned W. Beaudreau*, Central Power and Light Co., Corpus Christi, Texas.

Even 100 Per Cent Stand-by Can Fail——

THE moral of the old Mother Goose Nursery Rhyme on how small faults can cause huge losses was forcefully and not very amusingly brought to mind recently when the shearing of a steel pin, only ½ inch in diameter and 1½ inches long, started a series of failures which resulted in the complete shutdown of a large textile mill.

This mill used two turbine-driven forced draft fans to furnish combustion air for its four watertube boilers. Either one of the two fans was capable of supplying the air required by the boilers under any load, thus providing the plant with 100 per cent spare fan capacity. Fan Number 1, which was used as the spare fan, was direct driven. Fan Number 2 was driven through reduction gears.

The pin which started the failures was threaded into the low-speed gear of the reduction gear of Fan Number 2 and was used to drive a small gear oil pump which supplied oil to the gear mesh and bearings. When the pin sheared, the oil pump stopped, thus ending the flow of oil to the gear mesh. Although the condition was discovered almost at once, it was not soon enough to prevent damage to the pinion, which was scored and galled.



Spare fan which failed the morning after it had been put in operation to replace fan stopped by shearing of pin. Depended upon as a 100 per cent stand-by, spare fan proved no guarantee against shutdown when an end ring sheared at blade rivet line, causing almost complete destruction of fan, casing, and bearing pedestals.

Courtesy THE CONDENSER. *Published by the Mutual Boiler and Machinery Insurance Co.*

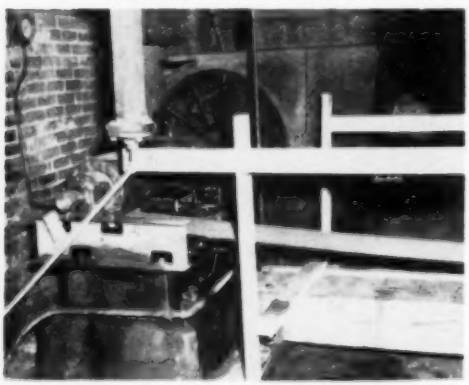
The spare fan (Number 1) was immediately put into service and plant production continued without interruption while plans were made for the replacement of the damaged gears.

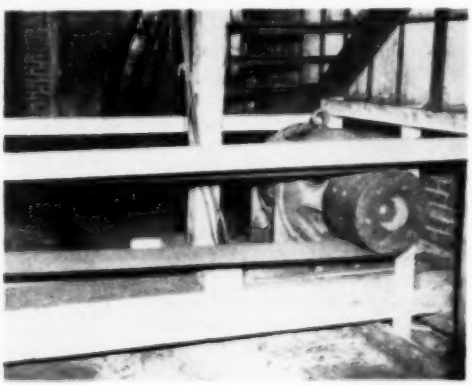
The following morning, however, a riveted section of the spare fan failed while operating at close to rated speed, causing almost complete destruction of the fan, casing, and bearing pedestals.

Plant personnel immediately went to work on the reduction gear of Fan Number 2, replacing the broken pin and dressing the damaged pinion. Fan Number 2 was then put back in operation, although the noise from the reduction gears was clear warning that the time it could be expected to operate before failure was limited.

A close examination of Fan Number 1 was then made. This fan was of the double element type, consisting of two end rings and a center

Temporary belt drive which was set up after both fans had failed. Power for belt-driving Fan Number 2 is provided by 50 hp induction motor bolted on 14-inch timbers braced against the reduction gear foundation.





ring with blading between each end ring and the center ring. Diameter of the fan was 36 inches and it was capable of supplying 48,600 cfm with a static pressure of 5½ inches of water at 1660 rpm. Weight of the fan and shaft was over 1,000 pounds.

One of the end rings had sheared at a blade rivet line and was forced up into the air duct after winding itself around the shaft. All of the blades at that end were thrown out and the tie rods were bent around the shaft. Some of the blades were thrown up into the duct and some found their way through the guide vanes and out onto the floor, smashing the guide vanes and part of the fan casing. The shaft was considerably bent before the bearing pedestals were torn loose and the turbine coupling bolts broken off.

Although the exact cause of the failure of the end ring is not known, apparently a stress concentration had built up at the blade rivet line and caused eventual cracking at that point. There was no evidence of any foreign material having entered the fan.

A new fan rotor, shaft, guide vanes and bearing pedestals were ordered for Fan Number 1, but five weeks' delivery was the best that could be promised.

As it became increasingly doubtful that the reduction gear of Fan Number 2 could continue to operate until the parts arrived for the other unit, a temporary drive was set up which could take over upon the failure of the reduction gear.

A 50 hp induction motor was bolted on 14-inch timbers which were braced against the reduction gear foundation and suitable pulleys were procured for belt-driving the fan. A stub shaft was machined to fit in the bearings of the gear casing, and keyways were milled in each end.

As feared, the reduction gear failed shortly thereafter, completely shutting down the plant as the boilers could not be operated on natural draft. The temporary drive was completed after approximately twelve hours of steady work and steam gradually was raised until the plant was again in production.

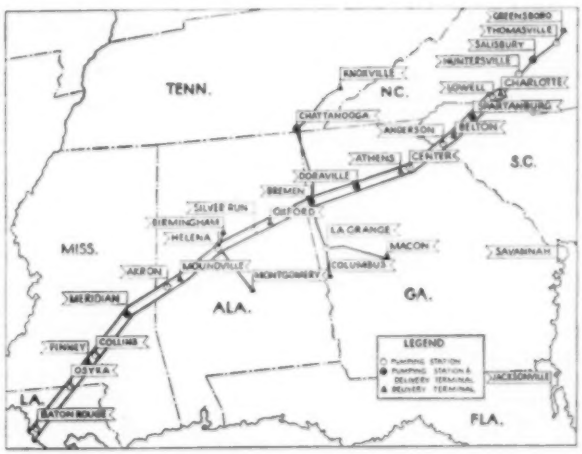
The temporary belt drive operated successfully until parts for Fan Number 1 were received and the fan again placed in service.

Failure of the ½-inch pin was undoubtedly due to a fatigue crack at the thread root, which is one of the most common points of stress concentration. Although the unit had operated for some 25 years without trouble, replacement of the pin at annual or bi-annual overhauls could have prevented fatigue cracks from forming at small expense.

Periodic replacement of parts such as this, where constant stresses are applied, should be a part of any preventive maintenance program, and should include such parts as crank pin bolts, follower plate bolts, etc. Larger threaded parts such as piston rods, shafts, etc., should be carefully examined at the thread roots at each overhaul period.

There is a tendency to *neglect equipment which has a spare available* on the grounds that if one fails, the other can be depended upon to operate until repairs to the first machine can be completed.

The failure of both these fans within hours of each other is undoubtedly an unusual circumstance, but it does illustrate that *even 100 per cent spare capacity is no guarantee against shutdowns and costly production losses.*



Plantation Pipe Line—La. to N. C.

On December 4, Plantation Pipe Line Company officially opened its new 700-mile petroleum products pipe line. Its location, delivery terminals and pump stations in the six states it serves are shown above.

PLANTATION PIPE LINE COMPANY, which transports petroleum products for delivery in six southeastern states, announced dedication of its new $52,000,000 parallel pipe line linking BATON ROUGE, LA., and CHARLOTTE, N. C.

The new 700-mile line, part of an expansion program Plantation started last year, will more than double its carrying capacity. It parallels the line which the company built 10 years ago to assure a continuous flow of liquid fuels from Louisiana and Texas Gulf-area refineries to southeastern markets.

With the opening of the new line delivery rate rises from 4,000,000 gallons of petroleum products daily to 10,000,000 gallons early in 1952. This rate can be increased another 50 per cent to keep pace with the South's future industrial growth by the addition of new pump stations.

The opening ceremony at Bremen, a key pump station and terminal 65 miles west of Atlanta, also marked the 10th anniversary of company operations. Plantation's original system consisted of 1261 miles of main and lateral lines connecting the refining areas with 18 delivery terminals in these states: MISSISSIPPI, ALABAMA, GEORGIA, SOUTH CAROLINA, NORTH CAROLINA and TENNESSEE.

Questions and Answers for Men in the Plant
HOW, WHY, WHEN, and WHERE

INTRODUCTION: This is the first of a series of "Q&A" articles designed to help plant men become more intimately acquainted with the equipment in their charge. A thorough understanding of the points covered, will improve operation and maintenance, and help employees advance to higher positions.

By A. T. LOHKAMP
Plant Engineer
Pasco Packing Co.
Dade City, Florida

PART 1
Refrigeration Equipment--Engineering and Application

This first section deals largely with engineering and application problems of refrigerants and compressors. The second section will discuss operating procedures and safety precautions.

Q—What is ammonia?

A—Ammonia is a colorless liquid the formula of which is NH_3. The ammonia molecule is composed of one atom of nitrogen and three atoms of hydrogen. It is non-inflammable until mixed with air. A 16% mixture of ammonia gas and air is explosive. It is toxic and precautions must be taken when working with ammonia so that strong ammonia fumes are not breathed.

Q—Name some of the common refrigerants other than ammonia?

A—Some of the common refrigerants are Freon 12, Freon 11, Freon 113, Freon 114, Carrene, methyl chloride, sulphur dioxide, and carbon dioxide.

Q—Why is ammonia more frequently used for low temperature refrigeration than any other refrigerant?

A—Ammonia is most frequently used for low temperature work because of the small volume in cu ft per pound of ammonia evaporated and because it has a high specific heat of evaporation. Also, because the pressures involved when ammonia is compressed are moderate.

Q—Why is carbon dioxide not used in modern practice?

A—Carbon dioxide requires tremendous condensing pressures and extremely heavy machinery. In comparison with ammonia, CO_2 at −32 degrees F would boil at 156.5 psig and ammonia would boil at 3.2 in. of vacuum. To maintain a −32 degree F evaporator temperature, we would have a suction of 3.2 in. of vacuum with ammonia and 156.5 psig with CO_2. At a condensing temperature of 90 degrees F, ammonia would have a condensing or discharge pressure of approximately 166 psig and CO_2 would have a condensing pressure of more than 1058 psig.

Q—What are the necessary components or parts of a simple refrigeration system?

A—The necessary parts of a refrigeration system are the evaporator (coil), the compressor, condenser, and expansion valve with necessary piping.

Q—What is latent heat of fusion?

A—Latent heat of fusion is the amount of heat that must be removed from 1 pound liquid to change it into a solid while the temperature remains constantly at the freezing point.

Q—What is the latent heat of fusion of water?

A—The latent heat of fusion of water is 144 Btu, or 144 Btu must be removed from 1 pound of water at 32 degrees F to change it into ice at 32 degrees F.

Q—What is a ton of refrigeration?

A—A ton of refrigeration consists of enough refrigeration capacity to freeze 1 ton of ice in 24 hours from water at 32 degrees F to ice at 32 degrees F or enough equipment to remove 288,000 Btu every 24 hours. A ton of refrigeration is the rate of heat removal. The rate of 288,000 Btu every 24 hours, 12,000 Btu every hour, or 200 Btu every minute are all equal to 1 ton of refrigeration.

Q—In the simple refrigeration system outlined in question 5, what is the purpose of the expansion valve?

A—The expansion valve serves

Comments Welcome:

Readers will have ideas of their own on these subjects. The author and the editor will appreciate comments and criticism.

Write to: The Editors, Southern Power & Industry, 806 Peachtree St., N. E., Atlanta 5, Ga.

Table Showing Properties of Saturated Refrigerants

	Condition at Atmospheric Pressure					Condition at 85 F Condensing Temperature				
Refrigerant	Boiling Point, Deg F	Liquid Density, # cu ft	Vapor, Spec. Vol. cu ft/#	Heat in Liquid, Btu	Heat in Vapor, Btu	Pressure, psig	Btu Content of Liquid	Btu Content of Vapor	Spec. Vol. of Vapor, cu ft/#	Toxicity Toxic in fair amts.
Ammonia	−28	42.57	18.00	12.8	602.1	181.1	149.4	632.6	1.419	Non-Toxic
Carbon Dioxide	−109.4		5.69	−112.9	133.4	1057.4*	97.1	97.1	.0348	Non-Toxic
Freon-11	75	92.3	2.679	23.26	101.45	7.27	27.43	103.83	1.887	Non-Toxic
Freon-12	−22	92.79	2.583	3.66	75.64	106	30.18	98.26	.338	Non-Toxic
Freon-114	38	94.93	2.052	17.82	79.06	26	31.5	94.93	.734	Non-Toxic
Methyl Cylaride	−10	62.58	6.178	10.75	194.87	95	50.84	206.62	.9333	Non-Toxic

* CO_2 table doesn't go above 87.8 degrees F.

to expand the liquid refrigerant from the high pressure region to the low pressure region where the refrigerant can pick up heat from the air surrounding or being forced through or over the coil.

Q—If we had no expansion valve, would this simple system operate?

A—No, because liquid would flow directly to the compressor.

Q—Why is the compressor necessary?

A—The compressor is the reclaiming part of the system. A system could be made to operate (so long as temperatures were maintained high enough to allow the ammonia to evaporate at atmospheric pressure) by simply having a cylinder of ammonia connected to a coil through an expansion valve and letting the ammonia pass from the coil to the atmosphere. This would be dangerous and very expensive. The compressor takes the ammonia at a low suction pressure and compresses it to a smaller volume at higher pressure so that it can be condensed into a liquid at ordinary water temperatures.

Q—Why must ammonia be at a high pressure in order to condense at ordinary water temperatures?

A—Ammonia as well as all other refrigerants and liquids has a definite boiling temperature and liquefying temperature for each pressure. The volumes of gases also change according to temperatures and pressure.

Q—What is Boyles Law?

A—Boyles law states that, "if the temperature remains constant the volume of a given quantity of any gas varies inversely as the pressure to which the gas is subjected." In other words, the volume decreases as the pressure increases and the volume increases as the pressure decreases.

Q—What is Charles' Law?

A—Charles' or Gay-Lussac's law states that, "at a constant pressure, the volume of a given quantity of any gas increases about 1/273 of its volume at 0 degrees C for each rise of 1 degree C and at constant volume the pressure of a given quantity of any gas increases about 1/273 of the pressure at 0 degrees C for each rise of 1 degree C in temperature." Let's change it to slightly simpler wording. If the pressure remains the same and we add heat to any gas, the volume increases 1/273 of volume of the gas at 0 degrees C for each increase of 1 degree C in temperature. If the volume remains the same the pressure will increase about 1/273 of the pressure at 0 degrees C for each 1 degree C of heat added.

Q—What is Dalton's law of partial pressures?

A—The pressure exerted by a mixture of gasses is equal to the sum of the separate pressures which each gas would exert if it alone occupied the whole volume.

Q—What is critical temperature?

A—The critical temperature is that temperature above which a gas cannot be liquefied by pressure alone.

Q—What is the triple-point?

A—The triple point located on a Mollier diagram for a refrigerant is that point or set of conditions which enable the refrigerant to exist as a gas, solid, or liquid. The actual conditions will probably be one in which the refrigerant will exist as part liquid, part solid and part gas.

Q—List some of the properties of ammonia.

A—Boiling point at 0 pounds suction is −28 degrees F. Specific gravity is .662 with ammonia at −28 degrees F. Weight/cu ft of liquid 42.57. Volume of vapor is 18 cu ft per pound. One pound of liquid ammonia at −28 degrees F contains 12.8 Btu. One pound or 18 cu ft of gas contains 602.1 Btu. Latent heat of evaporation 602.1-12.8 or 589.3 Btu per pound.

Q—Compare ammonia with some of the other refrigerants.

A—See table above.

Q—To maintain a −30 degree suction, what would be the suction pressures on each of the above refrigerants? .What would be the discharge pressures if the condensing water were 75 degrees F?

A—Use about 10 degrees differential between condensing water temperature and condensing temperature of the refrigerant. Then the condensing temperature of the refrigerant would be 75 + 10 degrees or 85 degrees.

	−30 deg. F. Suction	85 degree Condensing
Ammonia	2" Vac.	152 psig
Carb. Diox.	183.3 psig	1016 psig
Freon-11	27.81" Vac.	3.22 psig
Freon-12	6" Vac.	82 psig
Freon-114	24.72" Vac.	21.36 psig
Meth. Chlor.	12" Vac.	70 psig

Q—Why is ammonia more practical for refrigerating at low temperatures than some of the Freons?

A—Ammonia compared to Freon-12 for example will remove 602.1-12.8 Btu or 589.3 Btu from the refrigerated space per pound of ammonia handled at 0 pounds suction while Freon-12 will remove only 75.64-3.66 or 71.98 Btu per pound under the same conditions. Compressors would have to com-

press 8.18 pounds of Freon-12 to do the same amount of work in refrigeration. The above comparison may lead to some false conclusions so we must consider the fact the ammonia would have about twice the volume of Freon-12 on the discharge and the discharge pressure would be 152 psig compared to 92 for Freon-12 at 85 degrees condensing temperature. Generally speaking, however, much more of any of the Freons would have to be handled than if we used ammonia. Ammonia is also cheaper than Freon in initial cost.

Q—Why are Freons more adapted to centrifugal compressors than ammonia?

A—Because of the large volumes and low pressures involved.

Q—Are any centrifugal ammonia compressors manufactured in this country?

A—No. The only centrifugal ammonia compressors made are made in one of the foreign countries.

Editor's Note: While this was being edited, an announcement was received from Carrier Corp. that they are to install a 600 hp low stage unit raising ammonia from 25 pounds to 75 pounds for Monsanto Chemical Co. at Nitro, West Va. The centrifugal unit will be all ferrous construction.

Q—Why is ammonia harder to handle in a centrifugal compressor?

A—Because ammonia in the presence of moisture or air will attack brass or bronze and the discharge pressure would be much higher. Also ammonia is harder to handle because of packing on a high speed centrifugal shaft.

Q—What causes surging on a centrifugal Freon compressor?

A—Surging is caused when there is not enough vapor entering the suction of the machine to support the discharge. Surging is a reversal of flow from discharge side back through the machine to the suction side. When the suction builds up to the point where the gas will again support the discharge head, the machine will again operate normally.

Q—What is meant by anhydrous ammonia?

A—By the term anhydrous we mean without water or destitute of water. This means that the ammonia is pure and undiluted by water.

Q—What is meant by aqueous ammonia?

A—Aqueous ammonia means a solution of ammonia and water. This is the opposite of anhydrous ammonia.

Q—What is an absorption system?

A—The absorption system of refrigeration does not use a compressor but replaces the compressor by using heat. This is the principle used by the Electrolux refrigerator which refrigerates by using heat.

Q—Describe the absorption system cycle.

A—The absorption system employs aqueous ammonia and consists of a generator, rectifier, condenser, receiver, expansion valve, heat exchanger, absorber, and a pump. From the receiver the anhydrous (free of water) ammonia passes through the expansion valve to the heat exchanger or coils. This part of the cycle is the same as in any refrigeration system.

From the evaporator or coils the ammonia vapor flows to the absorber where the ammonia vapor is absorbed by the weak aqua solution. From the absorber the strong aqua solution flows to the aqua receiver. The aqua solution is now strong solution because it has absorbed the ammonia used by the evaporator and returned as vapor. From the strong aqua receiver the aqua solution is pumped to the generator where it is heated.

The generator is a heat exchanger. The heated strong aqua releases the ammonia vapor. The aqua solution is now weak and flows back to the absorber through the exchanger. The ammonia and steam from the generator pass to the rectifier. In the rectifier the strong aqua passes through tubes on the way to the generator and the ammonia and steam surround the tubes. The strong aqua picks up heat in the rectifier and the ammonia steam mixture gives up some heat so that the steam condenses and leaves the ammonia vapor anhydrous or dry. Then the dry saturated vapor passes to the condenser, is condensed to a liquid and flows to the receiver. The cycle then repeats.

Q—Trace the cycle of a simple refrigeration system employing anhydrous ammonia and compressors.

A—Starting with the liquid ammonia in the receiver, the pressure on the receiver forces liquid ammonia to the cold rooms, brine chiller, or wherever the chilling is to take place. Here the liquid passes through the expansion valve from the high pressure in the liquid line to the low pressure in the coils. During this expansion the heat in the liquid serves to vaporize a part of the ammonia. This part does no work toward cooling the room, but chills the rest of the ammonia to a temperature corresponding to the compressor suction pressure. The remaining ammonia in the ammonia evaporator is now conditioned to pick up heat from the room or heat-exchanger. The heat in the space surrounding the ammonia coil vaporizes the remaining ammonia so that it goes back to the compressor as a vapor. This vapor is compressed in the compressor so that conditions change. The discharge gas is at a higher pressure and temperature and superheated due to friction, etc. The discharge gas is then passed to the condenser which may use water as a cooling medium or may use air. The super heat and heat in excess of that contained in the liquid for the corresponding pressure is given up to the cooling medium (water or air) and the liquid ammonia drops over the tubes or cooling surface and into the receiver. Then the cycle repeats.

Q—Name the parts required for a compression refrigeration system including valves, etc.

A—

1. King valve.
2. Piping of correct size for the required amount of refrigeration.
3. Expansion valve.
4. Heat exchange surface which may be

(a) Bare pipe coils with natural air flow.
(b) Bare pipe coils with forced air circulation.
(c) Finned pipe coils with or without forced air circulation.
(d) Shell and tube heat exchanger.
(e) Other type of brine chiller.
5. Valves for isolating the heat exchanger.
6. Suction valve to the compressor.
7. Compressor with by-pass and pump out valve.
8. Discharge valve.
9. Oil trap.
10. Condenser.
11. Condenser isolating valves. If condenser is water cooled, water regulating valves.
12. Relief valves on condenser and receiver.
13. Receiver.
14. Receiver isolating valves.
15. Air purge valve.

Q—What is the king valve?

A—The king valve is the liquid valve at the condenser which serves as a liquid stop valve between the receiver and the rest of the system.

Q—Why are safety valves necessary?

A—To relieve the pressure on the condensers and receivers in case the pressure increases beyond safe practical limits. The safety valves relieve pressure to prevent explosion of these tanks or vessels.

Q—What can cause excessive pressure on the condensers or receivers?

A—Excessive pressure can be caused by having the source of cooling water or cooling air fail, having air in the system, fouling of condenser tubes, or having a condenser too small for the system. Other causes for excessive pressure may be closing the wrong valve, forgetting to open valves after repair of condenser or opening inlet valves, but forgetting to open the drain valves from the condenser. The last allows liquid to build up in the condenser which reduces the condensing space and tube area exposed to the discharge gases.

Q—What other precautions are advisable on a refrigeration system? Why?

A—It is advisable to have pressure switches which will shut off the compressor power source in event of high discharge pressure. In some instances this may require elaborate gear but it is the safest procedure. These high pressure shut off mechanisms are piped directly to the compressor discharge line and in event that someone should close the condenser inlet valve by mistake or forget to open the condenser inlet valve after repairs were made on the condenser, these safety mechanisms shut down the machine before the machine explodes or the discharge pipe bursts.

Q—How is the pressure set on the automatic high pressure shut off mechanisms? Why?

A—The pressure at which the safety high pressure shut off mechanisms will operate is usually set somewhat below the pressure at which the safety valves will relieve. This is done so that the machine will be shut down before the safety valve opens, and thus prevent loss of refrigerant. Then the only time the safety valves will relieve the pressure will be if the safety devices fail to operate.

Q—What safety precaution is absolutely essential when installing safety valves on an ammonia system?

A—Be sure that the discharge piping from the safety valves is extended out of the building and above the roofs of adjoining buildings. This is essential so that the escaping ammonia gas will be diffused in the air and not endanger the lives of the operating personnel or those who may be in adjoining buildings where they may be subjected to a strong slug of ammonia.

Q—What precaution should be taken at the discharge of the relief line?

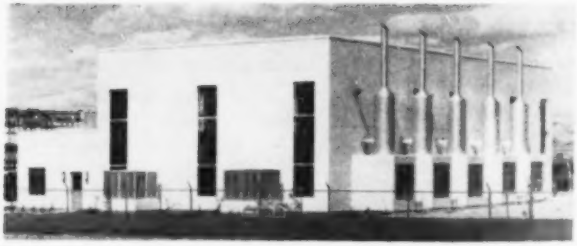
A—The relief line, even though it discharges above the roofs of the building and adjoining buildings should have the top fitted with a tee and a couple of elbows turned down so the pipe will not serve as a trap for rain or moisture and dust or falling debris. If the top of the relief valve discharge line is not protected, water and dirt may completely plug the line so that no relieving would take place even though the relief valves operated.

More Water For Memphis Plant

INCREASED manufacturing operations at the American Finishing Company in Memphis, Tennessee, has meant a greatly increased demand for water. Recently, the Layne-Central Company completed four Layne water wells and installed Layne pumps. Latest well is 340 ft deep and tested 1790 gpm.

Water from two of the wells is carried in an overhead gathering system to an iron removal plant originally designed by Layne-Central. Overhead pipes are used, as one of the wells is located in a cluster of concrete buildings and it would have been uneconomical to lay underground pipe. After treatment, the water is returned to the plant where it is used by American Finishing Company in both washing fabric and in their dyeing, bleaching and treating operations.

This Layne & Bowler photograph shows how water is pumped into the overhead line and carried to the iron removal plant in the background.



Five Diesel-electric units give rural consumers in three Arizona counties a 5000 kw power plant. Evaporative cooling reduces intake air from 108 F to 85 F.

Diesel-Electric Station for Arizona Farmers

By CLYDE F. LEWIS

General Manager
Central Station Equipment Company
Tucson, Arizona

ELECTRIC power for rural use has been growing rapidly in three counties in southern Arizona since 1947. The needs of the cotton planters for the 1948-49 cotton crop were met by a small, temporary power plant. This consisted of six used gas engine generating units and two diesel units which also furnished power in their immediate vicinity and for the construction of the main station.

The new 5000-kw station with five 1440-hp diesels driving 1000-kw generators was commenced in late October, 1949, 25 miles northwest of Tucson and 4½ miles west of Marana in the fertile Marana valley. It was completed in March, 1950. The operating company is Trico Electric Cooperative, indicating its three-county scope of operation. Its offices are in Tucson with *M. H. Voss* as General Manager, and *J. V. Swaim* as Engineer.

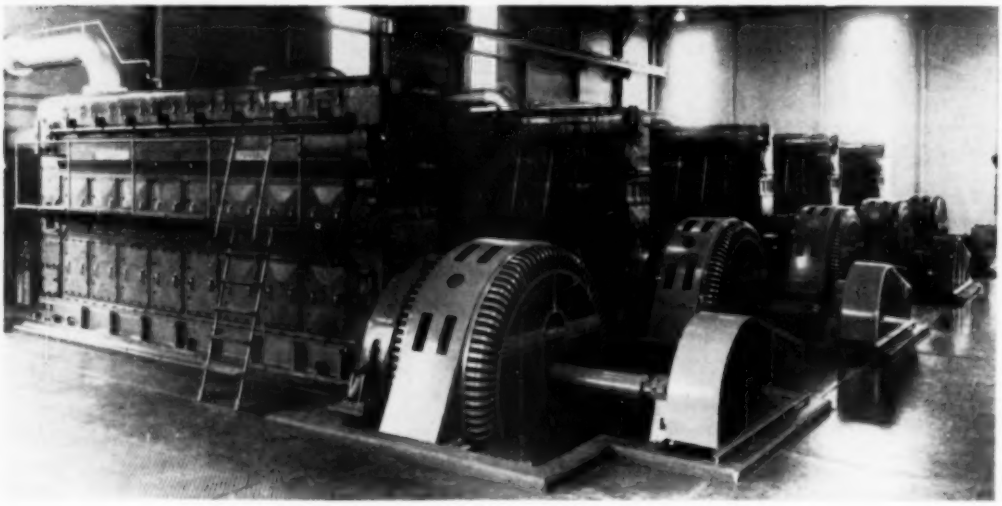
Cooling Intake Air

Since the air in this area has an extremely high temperature and low humidity in summer, a unique method of cooling the intake air is provided. Pad type evaporative coolers are used. Pads of approximately 6 x 9 ft and 6-in. thick are kept wet by a continuous flow of water from small pumps. Air is delivered at about 85 F to the engines when it is 108 F outside.

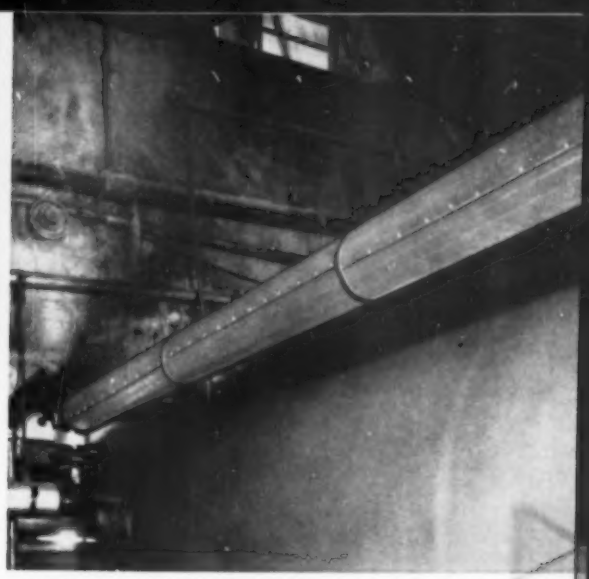
Each generating unit is independent of all others with respect to cooling, and transformer and synchronizing breakers connect with a 12,500 kv bus in the substation. Engine vibration is insulated from the building by cork and all of the main piping is provided with flexible sections which eliminate the possibility of vibration breaking connections.

Individual control panels for each engine are located at the forward end, near the governor. Accessory equipment includes before and after lubricating oil pump, jacket water

New power station consists of five 1440 hp, dual-fuel Superior diesel engines running on natural gas and driving five 1250 kw, 2400 v, Ideal Electric and Mfg. Co. generators.



IN PETROLEUM REFINERIES like this a new kind of aluminum jacketing is used to protect the insulation on hot and cold lines. It is known as Childers Aluminum Jacketing and is especially engineered to combine the long life and weather resistance of aluminum with a low first cost. It goes on quick and easy—can be used and re-used. It is made of tough but flexible .006" 35 aluminum alloy, so it handles easily and requires no shop forming.

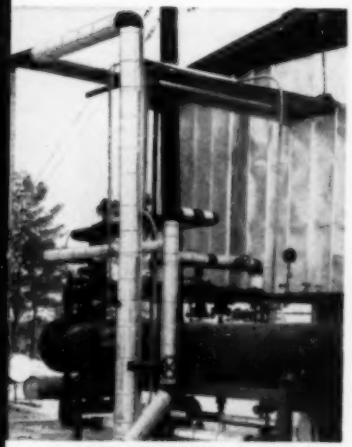


IN CHEMICAL AND PAPER plants: engineers are finding new uses for this easy-to-handle jacketing. Childers Jacketing here is in use at Scott Paper Company's tremendous Chester, Pa., plant. The insulated line passes between fast moving rolls carrying the felt used in paper making both above and below the line. The Aluminum Jacketing protects against paper dust and water, both of which are always present in the manufacture of paper. The jacketing also appreciably diminishes the possibility of the spread of fire which might strike across ordinary canvas jacketing.

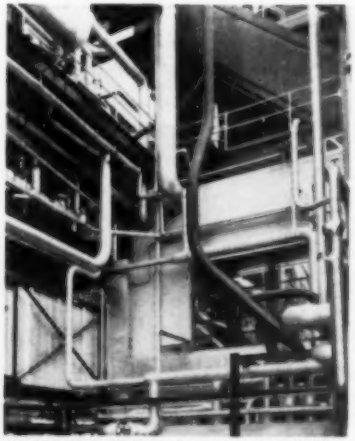
Engineered for outdoor lines — new, low-cost aluminum jacketing now used in 567 processing plants

The new kind of aluminum jacketing for insulated lines shown in the pictures on this page is Childers Aluminum Weatherproof Jacketing. Write for samples and full details, no obligation. Childers Manufacturing Co., Dept. SP-2, 625 Yale St., Houston 7, Texas.

Under CMP regulations, Childers is a Class B product, the use of which is not restricted.



IN FOOD PROCESSING plants such as this Minute Maid Corp. unit at Plymouth, Fla., Childers Jacketing is useful for both indoor and outdoor installations. Its clean, shining appearance and ease of washing are extra advantages.



IN POWER PLANTS—indoors and out—Childers Jacketing is an ideal material for protecting insulation. This is a big outdoor installation in the South. This jacketing needs no painting, and the gleaming aluminum surface makes for "good housekeeping" in any utility or institutional power station.

ALMOST ANYWHERE you have insulated lines in your processing plant, consider this specially engineered jacketing. It is flexible, easy-to-handle; yet it has the appearance values and the weather resistance that are inherent in aluminum. Write to address shown above for full details.

circulating pump, fan cooled radiators for oil and water, fuel pumps for both day tank and circulation, and a pump that delivers water for the evaporative coolers at the air inlet chambers.

All gages and the gas flow meters are mounted on the control panel, enabling the operator to check each engine individually. Each panel also has automatic shut-down equipment which operates if lubricating oil filters at the engine or the turbo charger fail, or if the engine should over-speed.

A year's operation has shown very low cost per kilowatt hour. The average load at the end of a year was 3400-kw and line extensions are expected to soon raise this average to between 4000 and 4500-kw.

PRINCIPAL EQUIPMENT

Engines	Superior, The National Supply Co. Engine Division
Generators and Switchgear	The Ideal Electric & Mfg. Co.
Cooling Equipment and Silencers	The Fluor Corporation, Ltd.
Step-up Substation	Pacific Electric Mfg. Corporation
Fuel Oil Filters	The Hilliard Corporation
Lubricating Oil Filters	Honan-Crane Corporation
Substation Steel	Allison Steel Mfg. Co.
Concrete Building Panels	Allison Steel Mfg. Co.
Air Intake Filters	Vortox Company
Gas Filters	Dollinger Corporation
Gas Meters	Pittsburgh Equitable Meter Co.
Fuel Oil Meters	Bowser, Inc.
Overhead Crane	Whiting Corporation
Water Circulating Pumps	Ingersoll-Rand Company
Lubricating Oil Pumps	Blackmer Pump Company
Temperature Control Valves	Fulton Sylphon Div. Robertshaw-Fulton Controls Co.

Control panels have only two push buttons, one for oil operation and one for gas—with corresponding signal lights. Fuel is selected by merely pushing the "oil" or "gas"

(*Continued on page* 113)

Oak Ridge Atomic Energy Exhibit on Nine Month Tour of Nation

HOUSED in a specially-equipped Trailmobile, a replica of the atomic energy exhibit in the American Museum of Atomic Energy at Oak Ridge, Tenn., is now on a nine months' tour of the nation under the auspices of the museum which is operated for the U. S. Atomic Energy Commission by the Oak Ridge Institute of Nuclear Studies, a non-profit corporation of 29 Southern universities operating under a contract with the Commission.

First appearance of the exhibit was at the Alabama State Fair in Birmingham, Ala., under the auspices of the university extension division of the University of Alabama. In each city, the exhibit is to be shown under the auspices of university extension departments of leading American universities and colleges, according to David L. DeJarnette, chairman of the Museum.

Exhibit Data

The atomic energy exhibits are designed to tell the story of atomic energy from the ore mining through its use in uranium reactors or atomic bombs, consistent of course with security requirements.

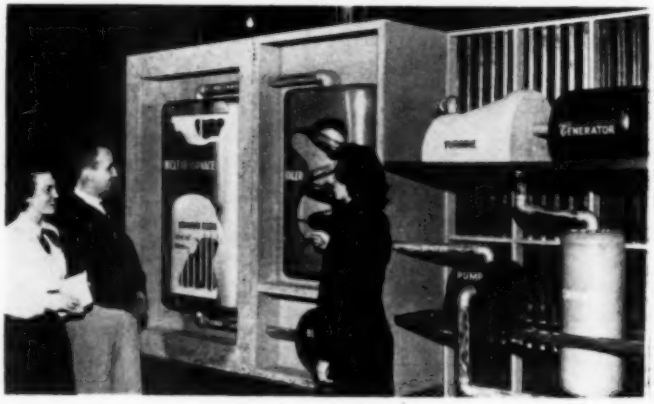
A small nuclear furnace in which Uranium-235 atoms are split is a feature of the show. Other exhibits are a 250,000-volt model of the Van de Graaff electrostatic generator used in nuclear physics research, a demonstration of radioisotope production, a Wilson cloud chamber, a model of the Oak Ridge uranium reactor, and illustrations of the use of radioisotopes in research.

Although emphasis is on the peacetime uses of atomic energy, a 27-minute technicolor film showing the "Operations Crossroads" tests is included in the traveling exhibit.

One of the most fascinating devices in the exhibit is the almost-human set of mechanical hands developed especially for the Atomic Energy Commission by General Electric.

When Miss Carolyn Bradford, University of Alabama graduate and assistant at the Oak Ridge museum, operates this mechanical wonder, crowds of spectators are invariably attracted. It demonstrates how the most intricate manual operations can be performed from behind a barrier and at a distance of 10 or 12 feet from dangerous radioactive materials, for the protection of the operator. Lipstick can be applied, matches can be struck, and tops can be screwed on bottles with the deft but complicated steel hands.

Workings of a nuclear furnace are being demonstrated by Miss Carolyn Bradford, staff assistant at the American Museum of Atomic Energy at Oak Ridge, Tenn., to visitors to the traveling atomic energy exhibit.



GARLOCK Valve Stem Packing, available in all sizes . . . from 1/16" to 3/4". Packaged on 1-lb., 2-lb., or 5-lb. spools.

Lasts *Longer*

— Keeps Production Zooming Along

GARLOCK 117—for use against steam at *low* or *medium* temperature, hot or cold water and aqueous solutions. Furnished either braided or twisted.

GARLOCK 17 — specially treated for use against steam at *high* pressures and temperatures up to 600°F. Braided round.

Avoid frequent shut-downs for re-packing by using packings that give long, dependable service. Typical Garlock products that give much longer service than ordinary packings are GARLOCK 117 and 17 Valve Stem Packings. They are both made from quality-controlled asbestos yarn. GARLOCK 117 is thoroughly lubricated and graphited. GARLOCK 17 is treated with a special heat-resisting compound and graphited.

Standardize on Garlock Valve Stem Packings!

THE GARLOCK PACKING COMPANY
PALMYRA, NEW YORK

In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

GARLOCK VALVE STEM PACKINGS

Helping the MAN-IN-THE-PLANT

Crane Control System Modernized

Air powered actuators in place of a mechanical lever system simplify operation of huge crane.

TO eliminate hard physical labor formerly required to operate a 20-year-old whirler crane, Southern Materials Company, Richmond, Va., installed a pneumatic control system. Air powered actuators instead of a mechanical lever system now apply clutches and brakes on the boom, holding line, closing line, and cab brake.

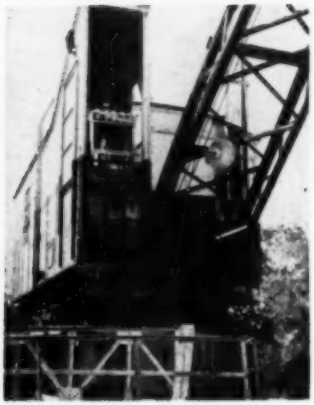
The new controls were specified when the regular operator became ill and substitute operators of less weight and strength could not handle the crane satisfactorily. Formerly operated by a man in the standing position because his full weight was required on both foot pedals and the 4-ft hand levers, the crane is now readily handled by a seated operator. Maximum force on all pneumatic controls is 10 lb.

Operation

A 5 hp compressor delivers 80 lb air pressure to the actuators. On the operating levers a back pressure of 8 psi is used in lieu of springs for returning levers and pedals. On the foot-operated holding and closing line brakes a preload of 5 psi is applied to give instant action and to minimize friction in the rigging or cylinders. These adjustments give the operator a better sense of "feel" and permit more accurate functioning of the equipment.

A safety feature of the new control system is the automatic application of brakes when and if the air supply pressure drops below 50 psi. This could occur in the event of a broken line in the main control system, compressor failure, excessive use of air, or other accidental cause.

The installation shows the simplicity of converting to Westinghouse Air Brake equipment since the pneumatic cylinders and controllers can be mounted almost anywhere in any position. Air lines may be located wherever space permits. This contrasts with the placement of mechanical linkages.



Southern Materials Company of Richmond, Virginia, installed Westinghouse Air Brake Company's pneumatic controls on this 20 year old crane. Five hand air controllers and two pedal controllers replaced mechanically operated hand and foot levers.

The crane is an electrically-driven C-14 Dravo whirler mounted 30 ft above the ground. Equipped with a 70 ft boom, it is rated at 15 tons at 35 ft. It is used to handle bulk materials, especially sand and gravel. These materials are unloaded from barges or railroad cars and are transferred to several mixing hopper bins by the crane.

$$ for your ideas . . . methods . . . short-cuts

Send your ideas, methods, etc. to *Southern Power & Industry*

Payment is made for suitable material.

Articles from engineers and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

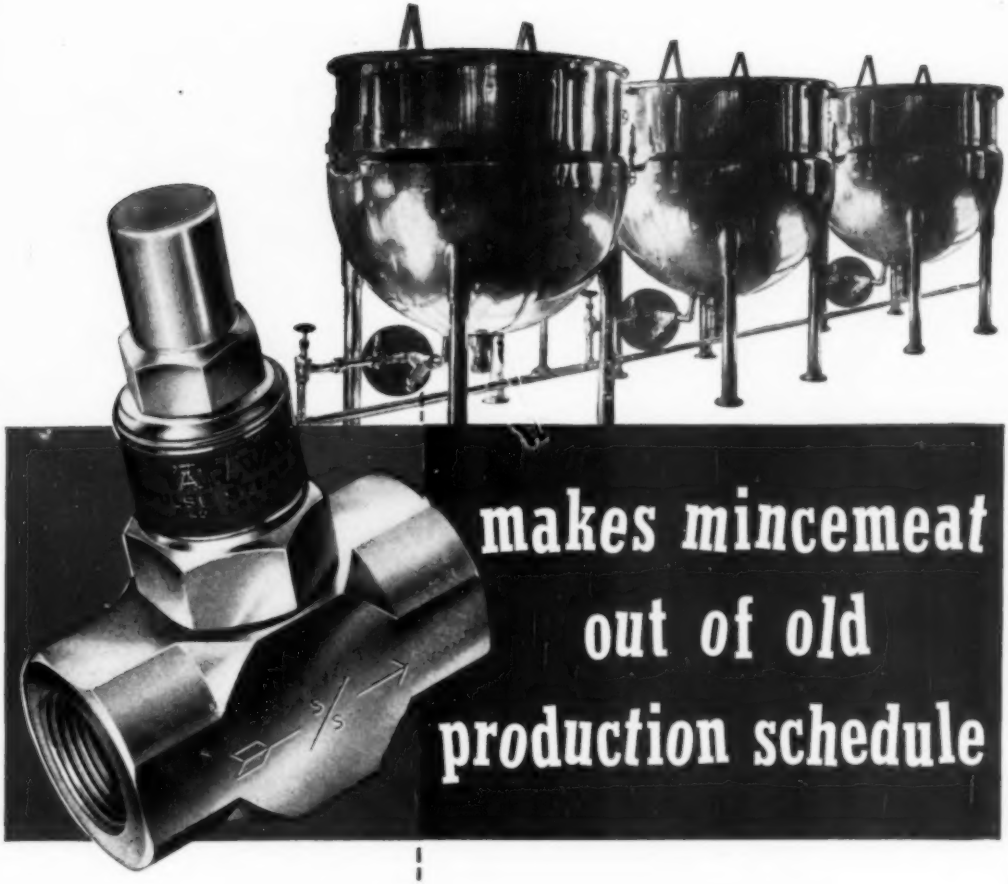
A photo or rough sketch will make your idea more valuable.

SP&I, 806 Peachtree St., N.E., Atlanta 5, Georgia

Insulating Hot Spot Electrical Leads

EVERY electrician knows how rapidly electrical insulation deteriorates under excessive heat. Yet, frequently equipment is installed in a plant with inadequate insulation for some of its electrical components.

At Roanoke Mills No. 1, for instance, the Sanforizing machines are equipped with electrically operated heating shoes maintained at a temperature of 350-400 F. Heat is supplied by electrical elements and thermostats imbedded in the steel shoes. Electrical connections failed frequently at the point where



makes mincemeat out of old production schedule

Thirty minutes per batch was the time schedule on mincemeat cookers at this eastern food plant . . . but that was **before** they replaced old-type traps with Yarway Impulse Steam Traps.

Now it's 15 minutes—one-half the time—and the plant superintendent is so enthusiastic over the production increase that he is personally spreading the news about Yarways to other plants.

A good record? Yes—but not unusual for Yarway. Yarway traps are **designed** to increase production—by sending the most practicable B.T.U.'s at top temperatures into your process or product. **They get equipment hotter, sooner . . . and keep it hot.**

Small size, easy installation, good for all pressures, dependable operation, low maintenance and low cost are other reasons why over 750,000 Yarway Impulse Steam Traps have already been installed in plants everywhere.

It's easy to buy Yarways . . . 216 industrial distributors stock and sell them. One is located near you.

YARNALL-WARING COMPANY
Home Office: 116 Mermaid Ave., Philadelphia 18, Pa.
Southern Representative:
ROGER A. MARTIN, Bona Allen Building, Atlanta 3, Ga.

NEW TRAP SELECTOR—New 20-page book tells you the right steam trap for any specific application. Write for your free copy.

YARWAY

the steam trap designed with production in mind

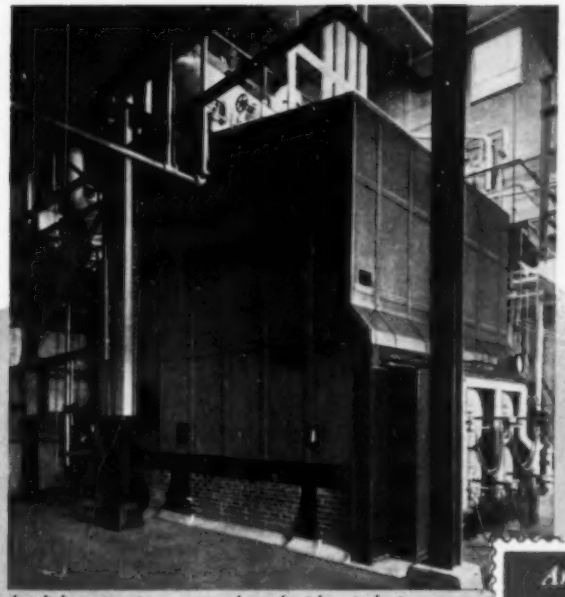
NOW

an integral-furnace boiler
for 30,000–70,000 lb. steam per hr.

TYPE FJ SAVES:
- fuel
- maintenance
- space

Integral-Furnace Boiler, Type FJ, arranged for stoker firing.

BABCOCK & WILCOX



This oil fired unit in an eastern processing plant is rated at 55,000 lb. steam per hr. . . . readily carries highly variable load without fluctuation of pressure.

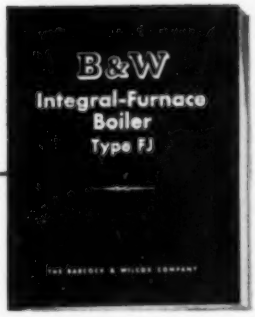
Another Example of B&W Engineering for Economy

The Integral-Furnace Boiler, Type FJ is a recent addition to B&W's line of completely coordinated furnace-boiler steam-generators. It makes available a compact, highly efficient installation to answer all process, heating, or power requirements from 30,000 to 70,000 lb. per hr.

Complete fuel-flexibility — coal, oil, or gas, with a choice of alternative firing arrangements — protects the investor against radical changes in fuel prices or conditions of supply. This unit burns a wide variety of fuels — including those of inferior grades and low-temperature ash-fusion characteristics — with high heat-rate efficiency, low maintenance, and minimum stack emission.

Unusually wide leeway in water-level and allowable boiler-water concentration is provided by the large drum and efficient cyclone steam separation system . . . which also contribute to ease in meeting sudden and severe load swings.

This unit incorporates all the advantages of Integral-Furnace design, which has proved so successful since its introduction by B&W in 1933. The popular Integral-Furnace "Family" now includes Types FH, FL, FJ, FF, and Shop-Assembled FM Units—spanning a range of steam-capacity now available from 2,800 to 350,000 lb. per hr.



Complete details of construction and operating advantages of the Integral-Furnace Boiler, Type FJ are included in new Bulletin G-70, available upon request from the Babcock & Wilcox Company, 85 Liberty Street, New York 6, N. Y.

the wiring entered the shoe. The impregnated tubing on the leads would not withstand the abrasion in spite of the fiber bushings inserted in each opening where the leads entered the shoe.

After considerable experimentation with different types of insulation, we finally found that taping the leads with Scotch #27 Electrical Tape with fiber glass backing eliminated the trouble. Tape of ½-in. width was used to facilitate handling in the narrow spaces between leads. Since installation of this tape, we have had no shoe failures directly caused by heating or abrasion of the Scotch #27 Tape. We heartily recommend that others having similar difficulties try out this tape as a possible means to eliminate the difficulty.—*Robert J. Tucker, Jr., plant engineer, Roanoke Mills Company, Roanoke Rapids, N. C.*

Longer Refractory Life

A SOUTH CAROLINA textile plant had been losing time and materials in their boiler room maintenance due to breaking up of brick along the grate line when a slash bar was used to break out fused slag. The soft kaolin brick being used would not stand up under this treatment.

Installation of Ironton Peerless stiff mud, slag resistant brick produced by The Ironton Fire Brick Co., solved their problem. This dense, abrasive resistant brick increased refractory life in their trouble spot by 5-6 times.

In the same plant, Ironton Mulcrete castable refractory was used in place of brick in the boiler doors, and increased life by 3-4 times.

Removing Rust Stains From Stone-Concrete

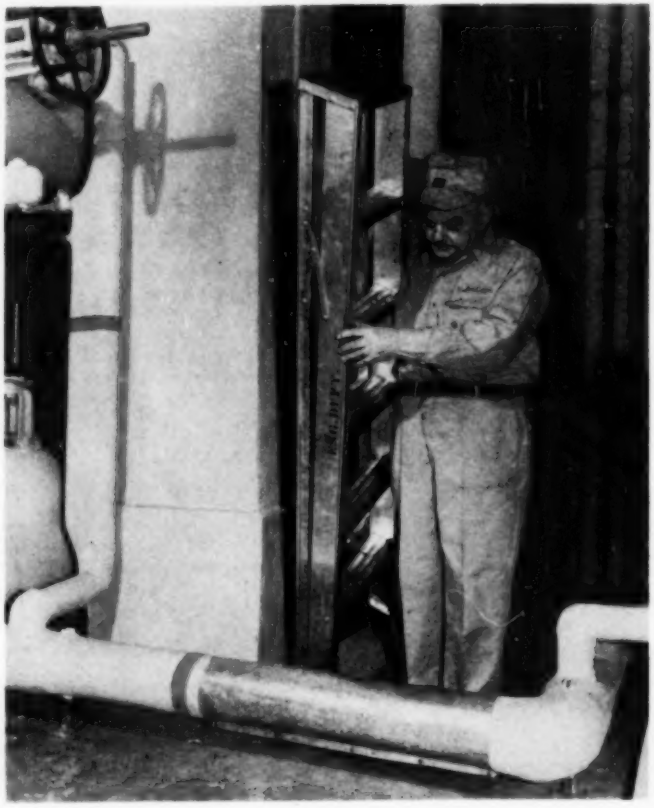
MUCH of the limestone used for building purposes is imbedded with small inclusions of iron pyrite that "bleed" in wet weather to form long, disfiguring streaks of rust on the otherwise clean, white surface. In other cases iron work fastened to stone, brick or concrete structures causes the unsightly blemishes that grow steadily worse with the passing of time.

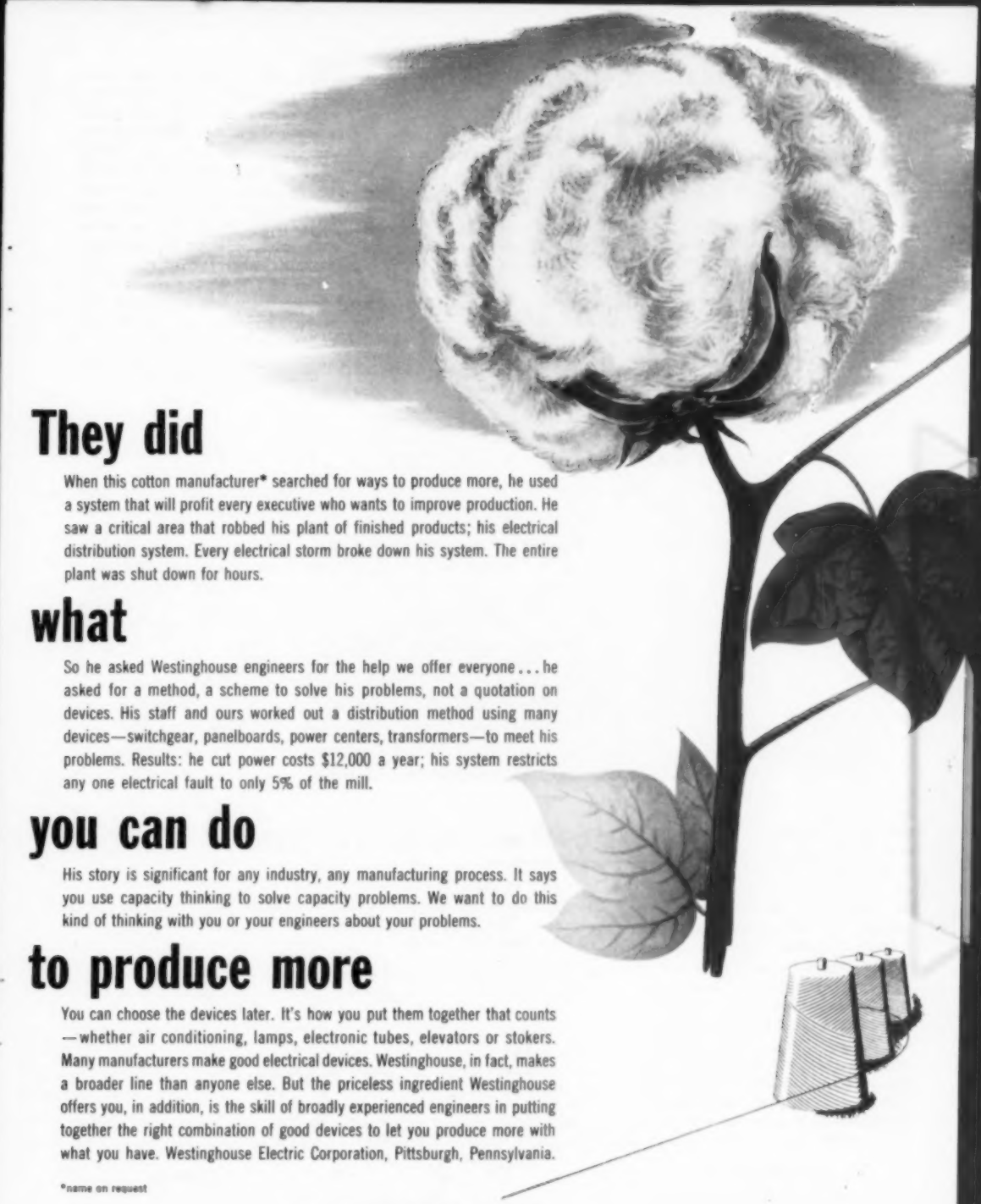
Removal of such stains can be a vexing problem to the maintenance engineer. Limestone will need the attention of the stone mason who will pick out the offending inclusions of pyrite with a sharp tool and fill the voids with a suitable tint of patching cement. A very effective and safe solvent is then prepared from one part sodium citrate, six parts of glycerine, and sufficient painters' whiting or hydrated limes to form a paste. The latter is applied with a cheap brush to cover all of the stained area. Leave the application in place for approximately 24 hours, then rub off with a wire brush. Light stains can be removed with one application. The more deeply ingrained blemishes will require several treatments.

While we have now eliminated the bad actor in the pyrite by chopping him out of the stone and removing the stains, we must also be sure we have covered all rusting iron work with a good primer coat of red lead (once the rust scale has been wire-brushed off the surface) and by following this up with a good application of aluminum paint. —*Paul C. Ziemke, Oak Ridge, Tenn.*

Steam Line Insulation Protection

A SHEET METAL JACKET is bolted over the steam line to protect the insulation from mechanical damage.





They did

When this cotton manufacturer* searched for ways to produce more, he used a system that will profit every executive who wants to improve production. He saw a critical area that robbed his plant of finished products; his electrical distribution system. Every electrical storm broke down his system. The entire plant was shut down for hours.

what

So he asked Westinghouse engineers for the help we offer everyone . . . he asked for a method, a scheme to solve his problems, not a quotation on devices. His staff and ours worked out a distribution method using many devices—switchgear, panelboards, power centers, transformers—to meet his problems. Results: he cut power costs $12,000 a year; his system restricts any one electrical fault to only 5% of the mill.

you can do

His story is significant for any industry, any manufacturing process. It says you use capacity thinking to solve capacity problems. We want to do this kind of thinking with you or your engineers about your problems.

to produce more

You can choose the devices later. It's how you put them together that counts —whether air conditioning, lamps, electronic tubes, elevators or stokers. Many manufacturers make good electrical devices. Westinghouse, in fact, makes a broader line than anyone else. But the priceless ingredient Westinghouse offers you, in addition, is the skill of broadly experienced engineers in putting together the right combination of good devices to let you produce more with what you have. Westinghouse Electric Corporation, Pittsburgh, Pennsylvania.

*name on request

YOU CAN BE SURE... IF IT'S

Westinghouse

Permanent Sand Bag Dry Wall Construction

CONSTRUCTION men have long been confronted with the problem of erosion at bridge heads and along creeks and canals where concrete shapes or stone are either unavailable or too expensive.

Sand bags will suffice only where the dry wall construction is of temporary nature, since in most cases the rotting of the bag material occurs well ahead of the complete settling of the earth.

The answer to the problem lies in adding a binder to the sand or other earth fill, which retains its strength long after the bagging has rotted and disappeared.

The admixture of 3 per cent by weight of 60 penetration asphalt to the sand will form a firm and durable bond. The sand must be previously heated to a temperature of 250 F.

Use these figures as your guide in making up the mixture: Batch—30 lb asphalt, 970 lb of sand. Using a powered concrete mixer two men can prepare the "mix" and fill 200 bags per hour, each bag weighing 160 lb. Asphalt sells at an average of $7.50 per ton, and with sand priced at $0.75 per ton we arrive at a price of $7.50 for 100 bags. Common labor, under the supervision of a foreman with an eye to reading plans and evaluating contours, can lay-up an inclined wall that appears to have been cast in a mold or poured in a form.—*Paul C. Ziemke, Oak Ridge. Tenn.*

Automatic Water Treatment Feeder

WE devised the illustrated automatic water treatment feeder to inject controlled amounts of chemical solutions at regular intervals.

The mixing vat is sized for a week's supply of solution and calibrated so solution concentrations are easily controlled. The solution may be mixed and tested while continuing the charge from the feed vat. Air agitation insures thorough mixing.

Operation

Solution flows by gravity from the feed vat through a check valve into the pressure pot. At selected intervals, air pressure forces the solution through the discharge line to the water to be treated. The volume of solution discharged from the pressure pot may be varied by raising or lowering the outlet line through a stuffing box.

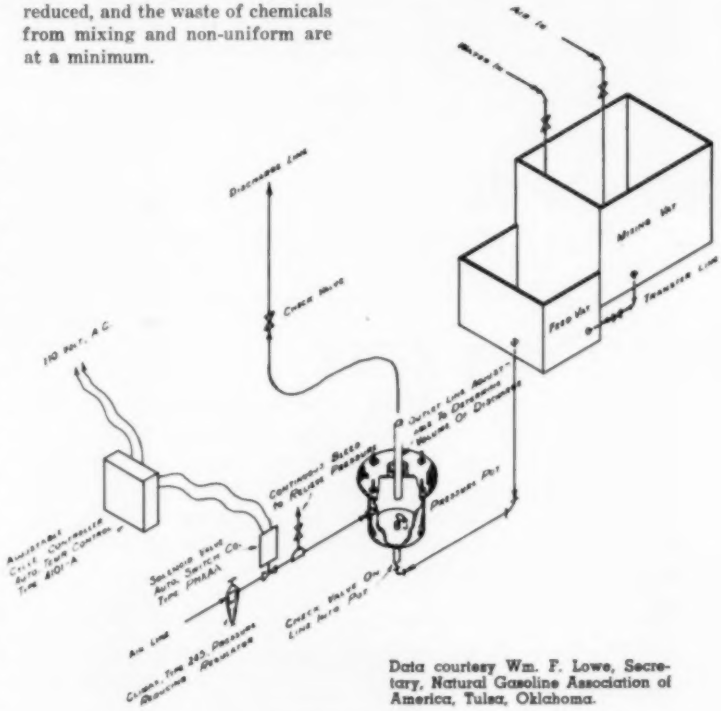
The electrical time cycle controller, at predetermined intervals, opens the solenoid valve admitting air pressure to the pressure pot for a selected length of time. The air pressure required is controlled by the pressure reducing regulator. The continuous bleed vents the air pressure and enables the pressure pot to refill.

Advantages

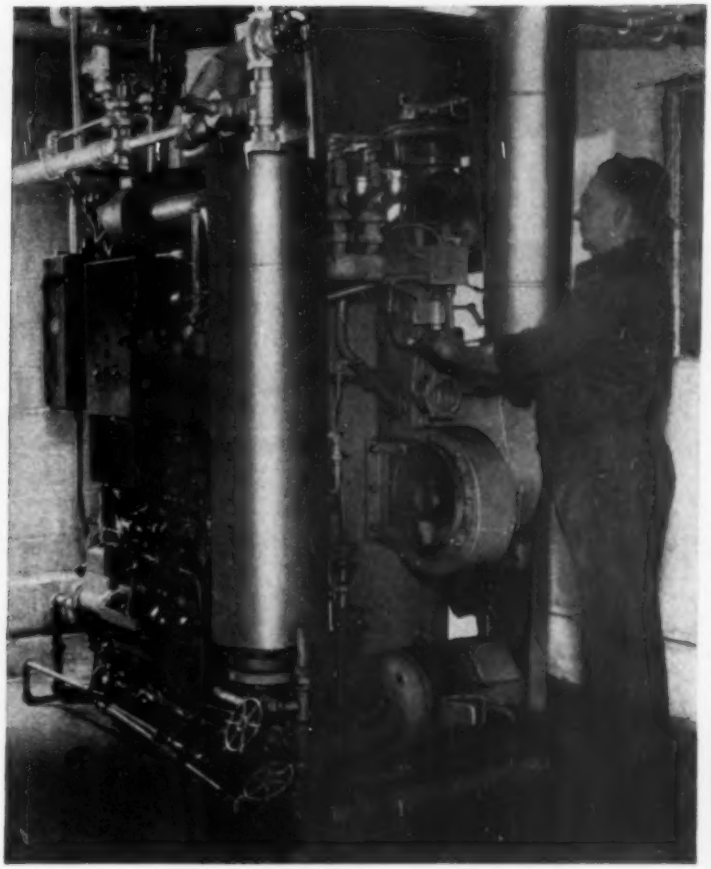
By utilizing the many adjustable features, (that is, by varying the concentration of the solution in the calibrated mixing vat, the volume of discharge from the pressure pot, the number of "blows" per hour), uniform treating is possible under a wide range of operating conditions.

This automatic water treatment feeder is inexpensive, simple in construction, easily adjustable, and offers trouble-free operation. The hazards of chemical handling are reduced, and the waste of chemicals from mixing and non-uniform are at a minimum.

Use of the feeder for six years has proven its practicability. The treating results obtained are superior to those obtained by the usual methods of adding chemical treatment. The original cost is insignificant when considering the savings in man hours and in chemicals.—*Chas. W. Miller, plant superintendent, Midland Gasoline Company, Conroe, Texas.*



Data courtesy Wm. F. Lowe, Secretary, Natural Gasoline Association of America, Tulsa, Oklahoma.



Why not-

make your steam *where you use it?*

You buy a boiler 15 or 20 feet square (or more) and just as high, and chances are you don't have room to install it very near to the places – often widely separated – where steam is to be used. So what do you do? You install, insulate and maintain expensive steam lines from the place the steam is produced to its point of use and then you continue to pay for inevitable condensation losses which can only mean higher steam costs.

Why?

Well, for one reason – some situations may make that the only practical way to do the job. *But* – in a great many instances you'll make a big saving in time, space and money by selecting the C-E Re-circulation Steam Generator – the unit that permits you to make steam *where* you *use* it.

If you have a space 7 feet square and about that high, that's all you need to set up the C-E Re-circulation Steam Generator. It's more than a "package" boiler – it's a complete steam plant including all controls and auxiliaries – a fully integrated unit – producing up to 6,000 pounds of steam per hour.

So – if you need steam . . . for continuous or intermittent load . . . for heating or processing – or both . . . for a location in your plant not now served by your existing boiler plant . . . for an occasional demand which exceeds the capacity of present boilers – if you want any or all of these, plus the advantages of maximum output from minimum space, then your best bet is the C-E Re-circulation Steam Generator. Don't buy any boiler in its capacity range until you investigate C-E.

C-E

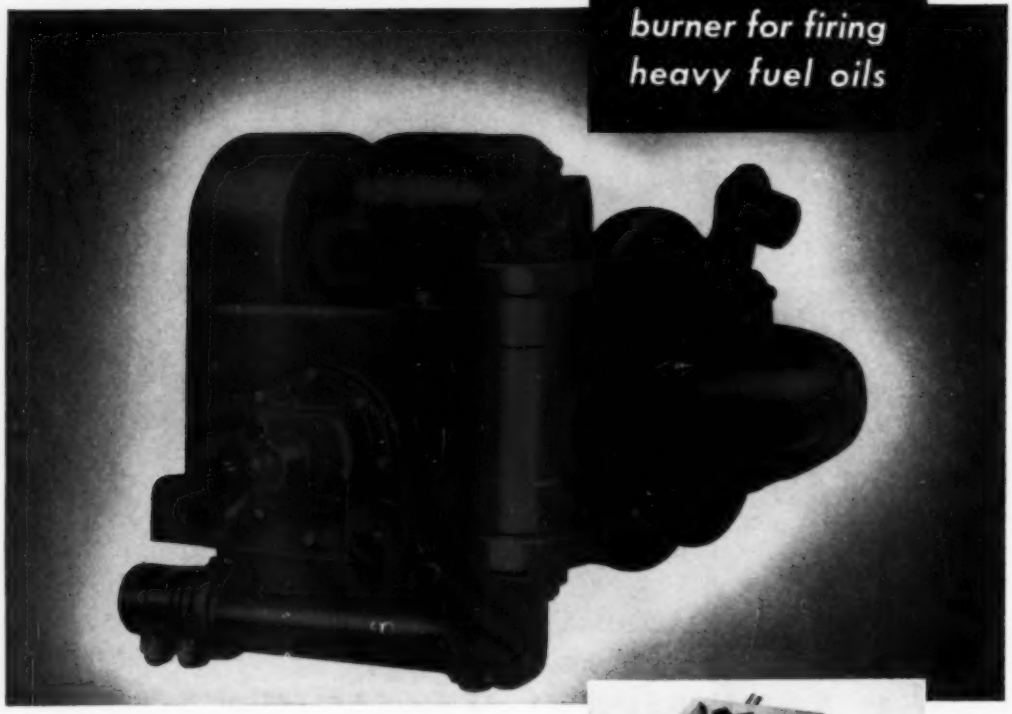
COMBUSTION ENGINEERING – SUPERHEATER, INC.

B-523A

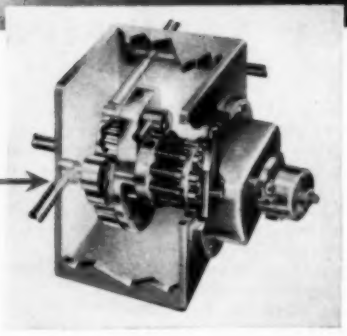
200 Madison Avenue, New York 16, N. Y.

PRECISION FIRING

Most advanced burner for firing heavy fuel oils



Here's the Iron Fireman Oil Volumeter that smooths out the flow of viscous heavy oils



The Oil Volumeter is the heart of the Iron Fireman Horizontal Rotary oil burner. It is a positive displacement, variable volume metering pump, completely submerged in the oil reservoir. Multiple pistons in a rotating cylinder block pull a predetermined, adjustable amount of oil into each cylinder in turn, and discharges it at low pressure to the nozzle. The result is smooth, uniform oil delivery, dependable performance and increased economy. No viscosity compensating devices or regulating feed valves are needed.

IRON

OIL, GAS and COAL FIRING

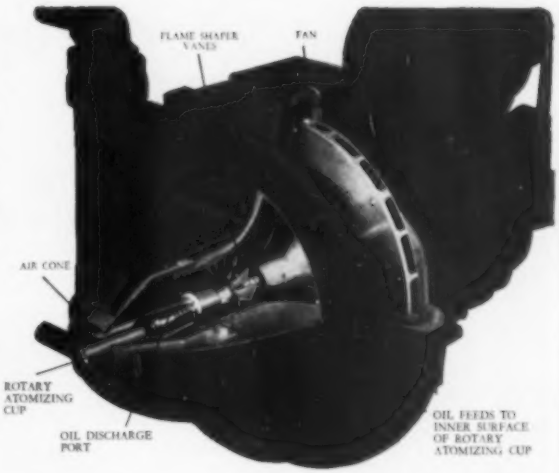
# of low cost heavy oils

with the Iron Fireman Horizontal Rotary Oil Burner

THE Iron Fireman Horizontal Rotary oil burner gives high efficiency over a wide range of oil viscosities. In some installations the fuel has varied in consistency from No. 1 to No. 6. No special burner adjustment was required to fire these oils with a steady, uniform flame.

Heavy oils have higher heat value

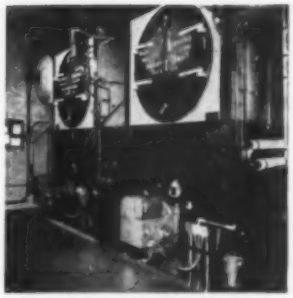
The heavy fuel oils (Nos. 5 and 6) contain up to 12% more Btu's per gallon than lighter oils, and in most areas they are lower priced. The Iron Fireman Horizontal Rotary oil burner thus offers you an opportunity to make substantial savings in fuel costs.



Oil feed rate controlled within ½ of 1% of setting

Even when throttled down to less than 20% of capacity this burner maintains a steady flame with automatic adjustment of air-fuel ratio for most efficient firing. Firing rate is infinitely variable and is actuated by a single lever which is linked to both oil and air controls. Burner is adaptable to manual, semiautomatic or full automatic regulation. When equipped with two-position motor the burner is adaptable to automatic low flame start, or Hi-Lo flame operation. Controls and motors are also available for automatic modulating fire control, which make possible high precision firing even when boiler load fluctuates rapidly between wide limits.

For further information write for new 16-page booklet, "The Iron Fireman Horizontal Oil Burner." Iron Fireman Mfg. Co., 3141 West 106th Street, Cleveland 11, Ohio. Other plants in Portland, Oregon; Toronto, Ontario. Dealers everywhere.



Capacities Range Up To 500 Boiler Horsepower

Multiple units for larger boilers

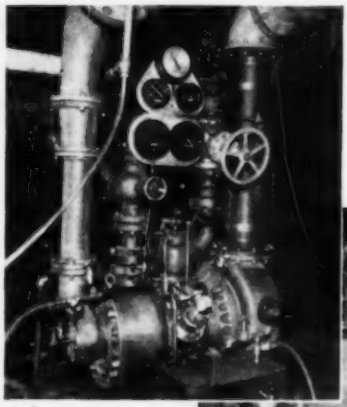
Models are available for a very wide range of capacities, beginning as low as 18 boiler horsepower. Top capacity for a single unit (500 b.h.p.) can be extended almost indefinitely by using multiple units in a single boiler. Many such installations carry a minimum summer load by firing only one burner.

FIREMAN

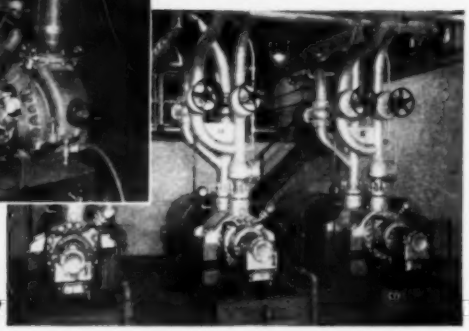
FOR POWER, PROCESSING or HEATING

more
and
more
Pacific
BOILER FEED PUMPS
are being built for

UTILITIES
INDUSTRIAL POWER PLANTS
MARINE SERVICE



Pacific Steam Turbopump



Typical Utility Boiler Feed Pump Installation

Type	Quantity	Pounds Per Hour	Degrees Temp. F.	Pounds Pressure
STEAM TURBOPUMPS	12 Pumps	31,600	250	810
ABF CENTRIFUGAL PUMPS	3 Pumps	358,120	220	1300
	4 Pumps	350,000	300	1060
	4 Pumps	455,000	336	1225
IBF CENTRIFUGAL PUMPS	3 Pumps	425,000	310	1825
	3 Pumps	495,000	306	1619
	6 Pumps	405,000	305	1750
	6 Pumps	405,000	305	1750
	3 Pumps	450,000	310	1825
	6 Pumps	550,000	334	2200
JBF CENTRIFUGAL PUMPS	2 Pumps	163,600	260	490
	1 Pump	117,500	250	775
	30 Pumps	95,000	250	810

PACIFIC
Precision Built
PUMPS

BF-10

Offices and Service in All Principal Cities

Pacific Pumps inc.

HUNTINGTON PARK, CALIFORNIA
Export Office: Chanin Bldg., 122 E. 42nd St., New York

practical discussion (continued)

Device for Checking Bearing Clearances

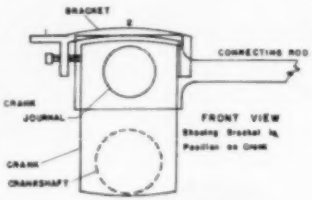
WE devised a bracket to support a surface gage over a crank bearing in order to measure the bearing clearance.

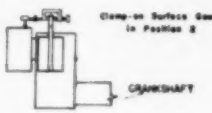
The bracket is fashioned in the general shape of a "C" clamp, with a rectangular steel plate opposing a screw for tightening across the crank. Bracket is fabricated from ¼-in. steel plate. This device is designed for use with a standard surface gage graduated in one-thousandths of an inch (.001-in.), to measure clearance on crank bearings where there is not enough room to use a feeler gage.

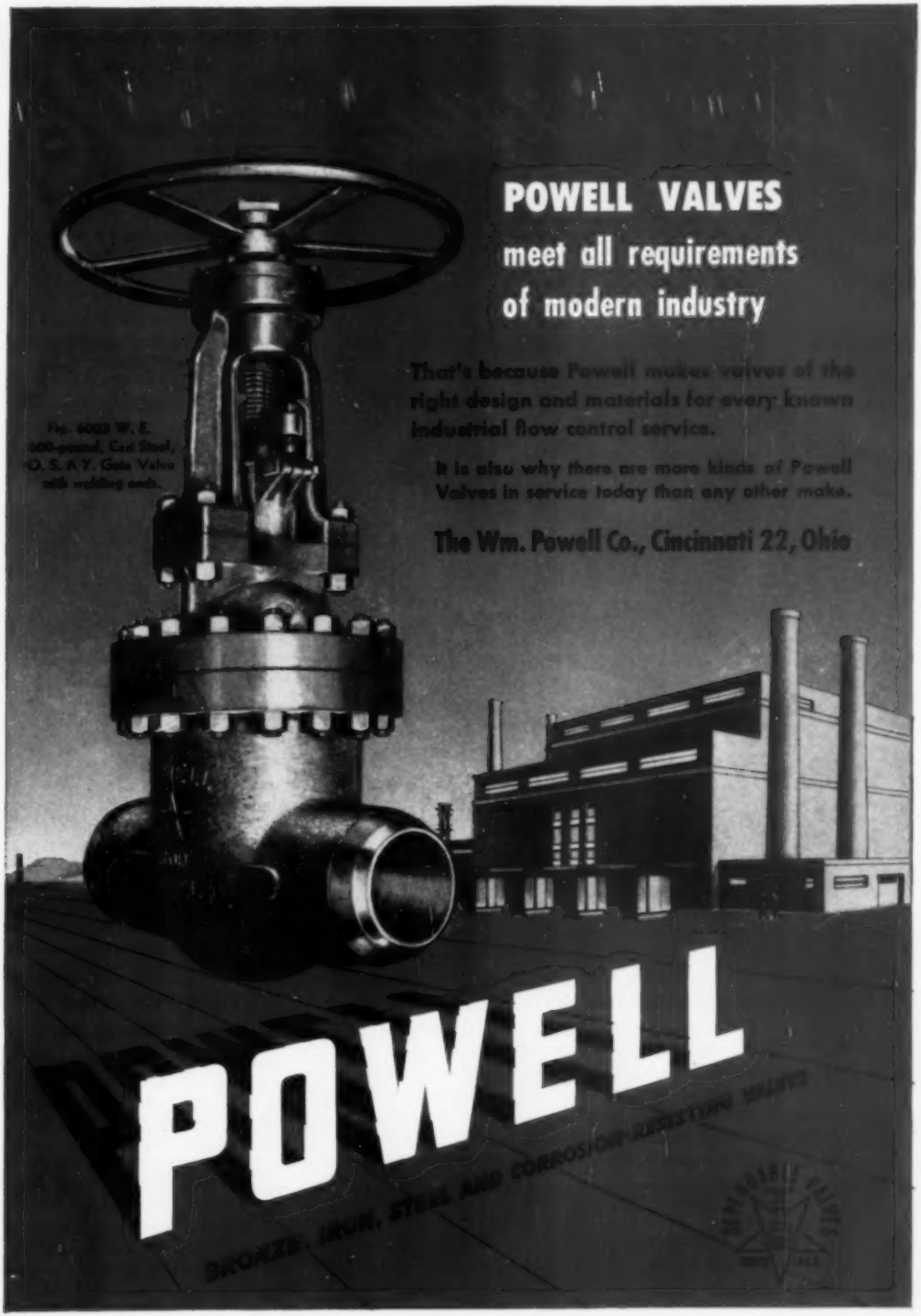
Application

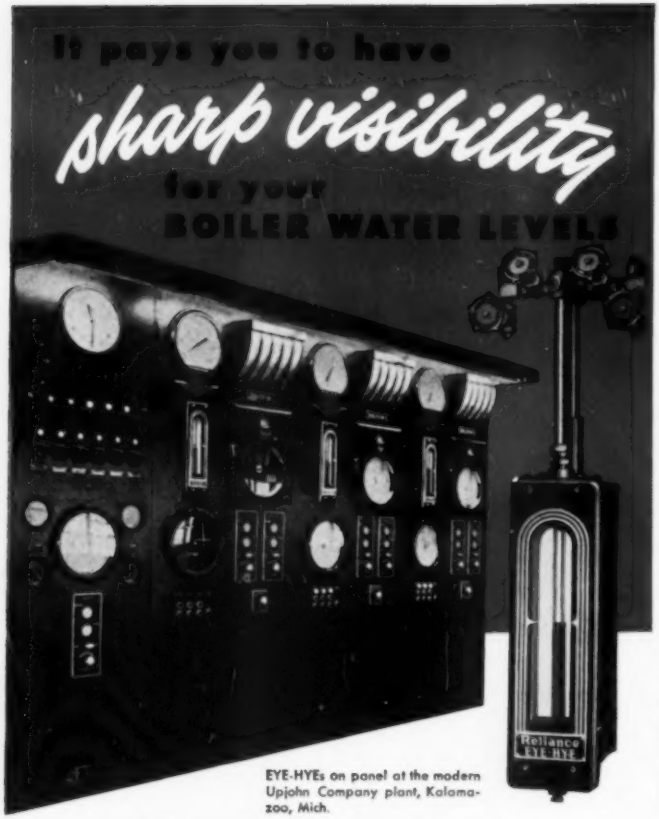
To measure the clearance, the surface gage is clamped to the top of the arch of the bracket with a universal clamp and a small "C" clamp. With the crank in a vertical position, the surface gage is set rigidly against the top of the connecting rod and the initial reading taken. Then by use of an overhead chain hoist, the connecting rod is elevated carefully until the bearing is in contact with the under side of the crank journal, and a final reading is taken. Difference between initial and final readings is the clearance.

Clearance in the horizontal direction may be measured similarly by moving the surface gage to Position #1 as shown on the drawing, and setting the gage shaft against the end of the connecting rod bear-






POWELL VALVES
meet all requirements
of modern industry
That's because Powell makes valves of the right design and materials for every known industrial flow control service.
It is also why there are more kinds of Powell Valves in service today than any other make.
The Wm. Powell Co., Cincinnati 22, Ohio
Fig. 6003 W. E. 600-pound, Cast Steel, O. S. & Y. Gate Valve with welding ends.
POWELL
BRONZE, IRON, STEEL AND CORROSION-RESISTING VALVES



EYE-HYEs on panel at the modern Upjohn Company plant, Kalamazoo, Mich.

EYE-HYE Remote Reading Gage Saves Time–Increases Safety

● Clear, mistake-proof reading of water gages right on your instrument panel, or wherever you want it—that's the modern way to get adequate supervision of vital boiler water. EYE-HYE brings an accurate reading to eye-height at control stations—shows water level in a liquid column, like a tubular gage. But its image is sharper, easier to read. Reliance VIZZENE, a special green liquid, brightly illuminated from behind represents the water level.

EYE-HYE is all-hydrostatic—is as simple as a manometer. It has no mechanical working parts—is calibrated at the factory for the individual boiler for which it is ordered. No adjustments or tampering possible on location. Easy to install—easy to maintain. Write for evidence of thousands of satisfied users.

The Reliance Gauge Column Co., 5902 Carnegie Avenue, Cleveland 3, Ohio

practical discussion (continued)

ing cover. Then by using a flywheel jack to oppose a bar through the spokes of the flywheel, a rocking motion may be created with just enough magnitude to move the bearing through its clearance and not disturb the position of the crank. Readings are taken in the same manner.

This device was designed specifically for use on Type GMB Cooper-Bessemer Direct-Connected Engine-Compressor Units. — *Quintin H. Gambrell, plant repairman, Magnolia Petroleum Company, Kilgore, Texas.*

Data courtesy Wm. F. Lowe, Secretary, Natural Gasoline Association of America.

Sleeve Bearing Makes Savings

A steel foundry using ball bearings on a certain heavy duty machine reported that bearing life was from 80 to 600 hours, unpredictable, and necessitated frequent shaft replacement. Machine down time 12 hours minimum.

A vast improvement was found in a Morganite sleeve bearing whose recorded life is in excess of 3000 hours. As replacement time can be anticipated, work can be done over week-ends. Shafting remains in good condition. Direct savings—400 per cent minimum. Production and maintenance savings are appreciable.

Tank Protected Against Corrosion

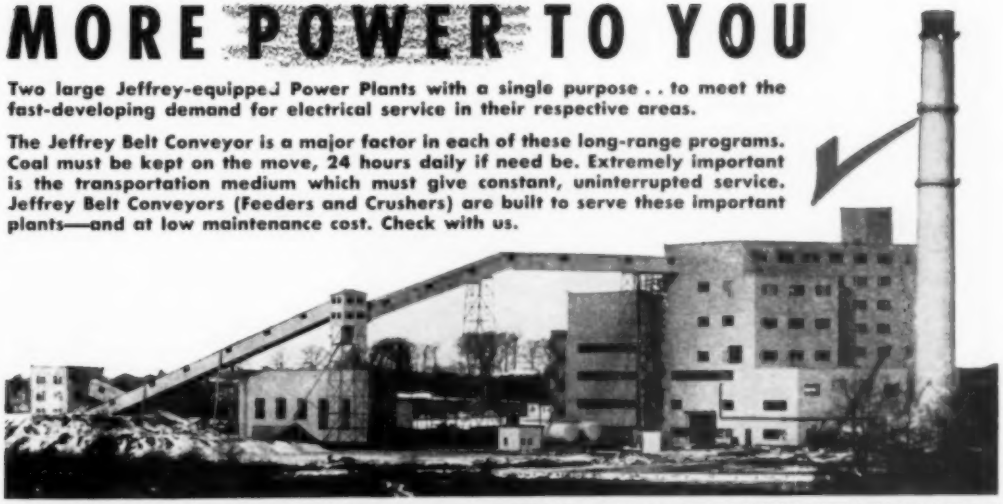
A MILD steel tank has been put to use as a container for muriatic acid after being flame-sprayed with polyethylene by Southern Lead Burning Company, Atlanta, Georgia. No defects were noted in the tank after being used to hold acid for six weeks.

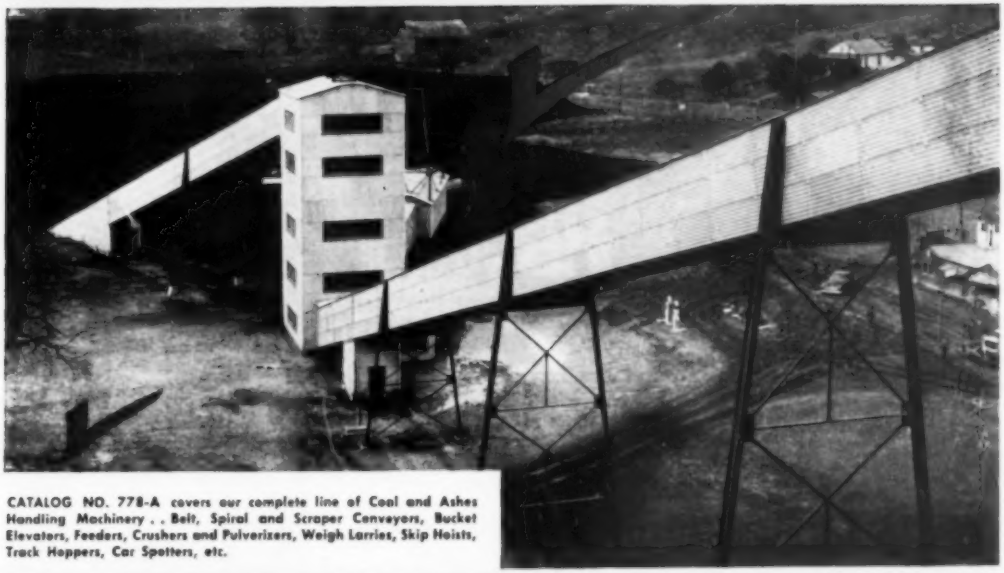
The steel tank, 4 by 5 ft and 3½ ft deep, was constructed from ¼ and 3/16-in. thick mild steel plate. Before being coated with polyethylene it was sandblasted to remove

MORE POWER TO YOU

Two large Jeffrey-equipped Power Plants with a single purpose . . to meet the fast-developing demand for electrical service in their respective areas.

The Jeffrey Belt Conveyor is a major factor in each of these long-range programs. Coal must be kept on the move, 24 hours daily if need be. Extremely important is the transportation medium which must give constant, uninterrupted service. Jeffrey Belt Conveyors (Feeders and Crushers) are built to serve these important plants—and at low maintenance cost. Check with us.





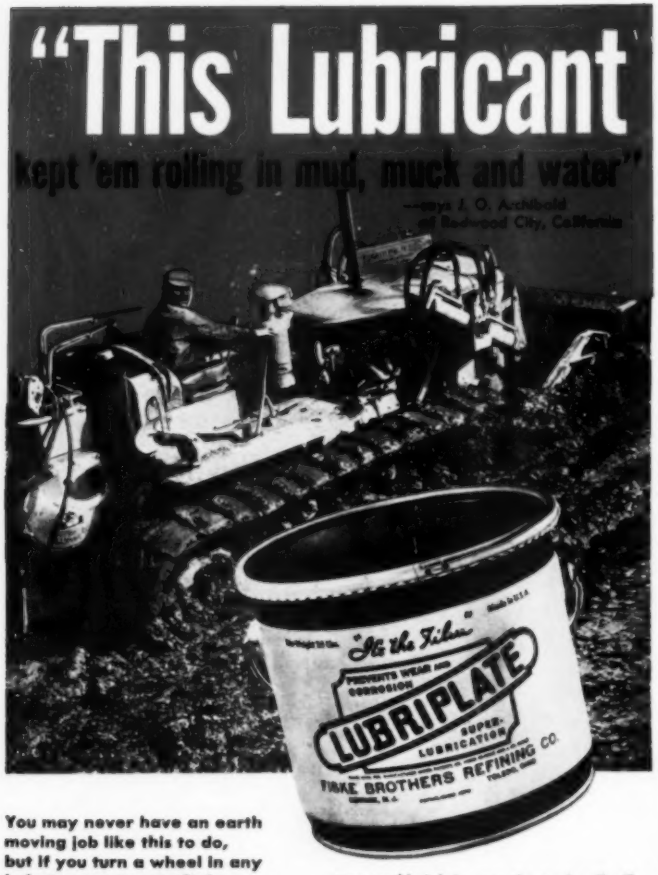
CATALOG NO. 778-A covers our complete line of Coal and Ashes Handling Machinery . . Belt, Spiral and Scraper Conveyors, Bucket Elevators, Feeders, Crushers and Pulverizers, Weigh Larries, Skip Hoists, Track Hoppers, Car Spotters, etc.

THE JEFFREY MANUFACTURING COMPANY ESTABLISHED 1877

Complete Line of Material Handling, Processing and Mining Equipment

"This Lubricant kept 'em rolling in mud, muck and water"

—says J. O. Archibald of Redwood City, California



You may never have an earth moving job like this to do, but if you turn a wheel in any industry you can profit from Mr. Archibald's experience.

"The Leslie Salt Company called for bids for the conversion of 500 acres of salt marsh into crystallizing ponds for the production of bulk salt. The going was so tough that none of the several contractors invited to bid would take the job on a fixed price contract. Due to our success on similar work, the job was given to us on a cost plus basis.

"We moved in eighteen tractors as power units and the necessary Carryalls, Sheep Foots, Jeeps and other equipment. As soon as we removed the upper crust there was nothing but peat and marsh to run on. Tractors would sink in over the track rolls. To keep equipment rolling would require a special lubricant.

"Knowing from past experience that LUBRIPLATE No. 107 not only reduced friction to a minimum, but it also prevented rust even in salt water and would seal out the muck, we adopted it for track and general lubrication. We selected LUBRIPLATE APG-140 for all transmissions and final drives. The effectiveness of these two LUBRIPLATE Products is evidenced by the fact that during the entire job there were no replacements of track rollers nor were there any tie-ups of equipment due to replacement or breakage."

J. O. Archibald

Yes, LUBRIPLATE Lubricants are different!

They reduce friction, wear and power consumption, prevent rust and corrosion and last longer than ordinary lubricants. LUBRIPLATE Lubricants are available from the lightest fluids to the heaviest density greases. There is a LUBRIPLATE Product best for your every lubrication need. Write for information about the use of them in your industry.

LUBRIPLATE DIVISION—Fiske Brothers Refining Company, Newark 5, N. J., Toledo 5, Ohio.

DEALERS EVERYWHERE—SEE YOUR CLASSIFIED TELEPHONE BOOK

LUBRIPLATE *THE MODERN LUBRICANT*

practical discussion (continued)

rust and other impurities, and to roughen the surface to improve the mechanical bond between the metal surface and the flame-sprayed coating.

A DM-1607 Flame-Spraying Gun, manufactured by Linde Air Products Company, was used to apply the polyethylene. The gun was also used for preheating, which is necessary in polyethylene flame-spraying. After the preheating a coating approximately .05-in. thick was applied to the tank. Several passes were needed to build up the coating to this thickness. The speed of the flame-spraying on each pass, after the initial preheating, was comparable to the speed of paint spraying.

After the coating was applied it was tested for porosity with a spark gap tester. No porosity was found. Since polyethylene is thermoplastic, the coating could have easily been patched if any porosity had been discovered.

Tests made on the tank after six weeks of muriatic acid service showed no corrosion of the mild steel plate. The tough, flexible coating was also undamaged mechanically after six weeks.

An operator is spraying a mild steel tank with polyethylene to protect it against the corrosive effects of muriatic acid. A flame-spraying gun, which uses a high heat oxy-acetylene flame, is being used for the flame-spraying and also was used for preheating.

ARMSTRONG "BLAST" TRAPS SPEED UP HEATING

of Single Pipe Coils, On-and-Off Multiple Coils, Unit Heaters, etc.

IN equipment where large amounts of air accumulate when the steam is turned off, and where the air can be pushed out ahead of the steam, Armstrong "Blast" Traps provide remarkably fast heat-up. A corrosion resistant invar and stainless bi-metal strip holds open a very large vent which lets air whistle right through the trap when equipment or lines are cold. As soon as steam reaches the trap, the bi-metal closes the big vent.

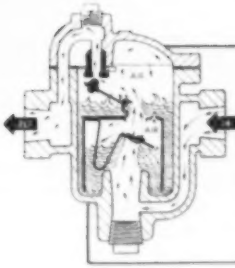
Armstrong Blast Traps combine the benefits of quick heat-up with the dependable service of mechanical traps. There is no bellows to leak or collapse due to high pressure. In fact, the traps are hydraulically tested at 500 lbs. pressure before they leave the factory.

Call your nearby Armstrong Representative for details and prices.

ARMSTRONG MACHINE WORKS

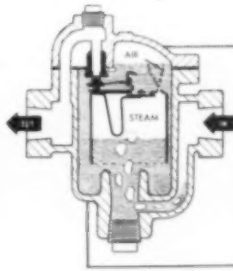
806 Maple Street • Three Rivers, Michigan

AIR WHISTLES RIGHT THROUGH



VENT OPEN

Note large air bubbles "whistling" through large thermic-control vent to be discharged with condensate through open trap valve. Shaded grey area is condensate.



VENT CLOSED

After accumulated air and condensate are discharged, large vent closes. Small vent is always open to handle ordinary volume of air entering trap.

THE ARMSTRONG STEAM TRAP BOOK tells all about Armstrong Blast and Standard Traps—where to use them and how to select and install them. You are welcome to a copy. Just write for it.

SEE OUR CATALOG IN SWEET'S

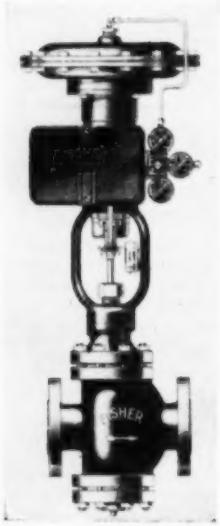
ARMSTRONG STEAM TRAPS

For Restricted Flow Requirements

3 STANDARD METHODS OF RESTRICTING INNER VALVES

FISHER®

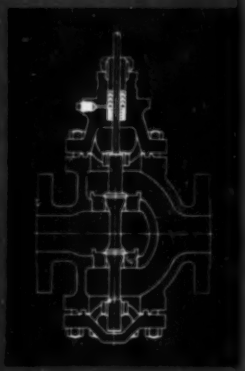
DIAPHRAGM CONTROL VALVES



Reasons for using restricted trim: (1) where later conditions require either larger or smaller capacities, (2) a full sized valve body is desired for line strength but with low capacity requirements — Fisher 3 standard methods offer a quick, economical and completely satisfactory way of solving these problems.

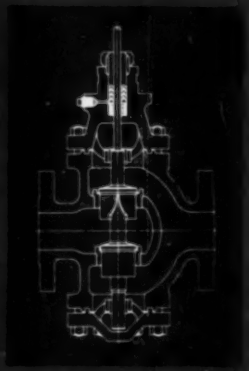
Size of restriction available: Restricted Inner Valve ports should be held to minimum size of not less than 50% of standard port diameter for valve body size, or equivalent of 25% of maximum full size valve capacity.

Practical considerations have proven it is undesirable to reduce flow to less than 25% of maximum capacity of body in double ported valves.



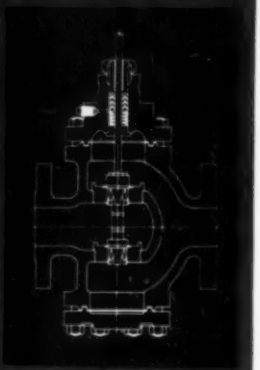
FOR TOP AND BOTTOM GUIDED THROTTLE PLUG INNER VALVES

Restricted Throttle Plug with port diameters reduced. Full distance between seats. Reduces minimum control flow to that of restricted port size.



FOR TOP AND BOTTOM GUIDED V-PORT INNER VALVES

Restricted V-Port with full port diameter but with restricted lobes. Full distance between seats. Allows for quick, easy change in field — no need to change port rings.



FOR SLEEVE GUIDED INNER VALVES

Restricted* Quick Opening or V-Port inner valve with port diameters reduced. Full distance between seats.

FISHER GOVERNOR COMPANY
Marshalltown, Iowa

FISHER

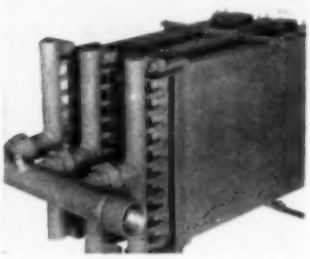
LEADS THE INDUSTRY IN RESEARCH FOR BETTER [illegible]

NEW EQUIPMENT for Southern Industry

Free additional information is available to readers of Southern Power & Industry. Check item number on the postage free service coupon post card—page 17.

Gas Burner

A-1 THE WEBSTER ENGINEERING COMPANY, Tulsa, Oklahoma, announces the Rectilinear gas burner which uses an unusual application of the venturi principle.



These three Webster Engineering Rectilinear gas burners are gang mounted and manifolded with a single inlet.

This new unit provides high input through very narrow rectangular openings. Its small dimensions and unusually light weight simplify the application problems in adding gas firing over stokers and oil burners already in service. According to the manufacturer, practical applications may be made at pressures as low as 1 psig. The unit will modulate to 4 oz without flashback.

The burner was originally designed to provide a primary air inspirating gas burner with a rectangular flame retention nozzle suitable for inter-tube firing of water walled combustion chambers. It has been found to be almost universal in applications for miscellaneous jobs, including firing in a horizontal plane through fire doors or small openings over handfired coal grates, firing in a vertical plane on either side of a stoker or oil burner, and firing in a horizontal plane over oil burners or stoker hoppers.

Suction Valve

A-3 FRICK COMPANY, Waynesboro, Pennsylvania, has developed an improved suction valve of the plate type for use in refrigeration machines using ammonia.

The new valve, known as the "Gar-

Steel Fabricated Blower

A-2 LAMSON CORPORATION, Billmyre Blower Division, Syracuse, N. Y., has announced a new line of fabricated steel blowers of large capacity, limited in size only by available manufacturing space.

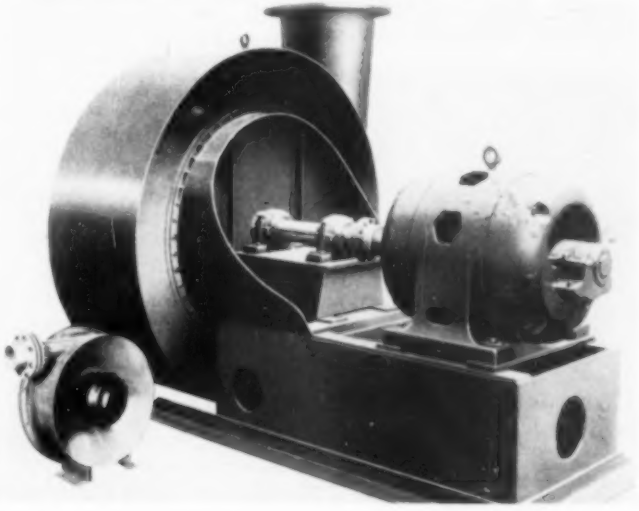
Standard models in the new line range up to 200 hp. Latest steel cutting and continuous welding methods have made the new designs possible. In addition to larger size, the new line offers weight saving and space economy not heretofore feasible in cast blower construction.

Three styles are offered: the multistage and the single-stage operating at 3500 rpm; and a model operating at 1750 rpm. Standard outlet pipe sizes run from 4 to 24-in., all flange fitted. The smaller models (through 10 hp) are particularly useful for mezzanine or elevated mounting in either vertical or horizontal positions. Designed on a standard basis for air only, they can be adapted to the use of corrosive, poisonous or explosive gases on special orders calling for stainless or sparkproof materials and special gasketing.

Blower outlets may be oriented in any of fourteen positions depending upon the desired discharge angle and offset (from shaft center line).

Delivered air pressures up to 3 psi (5.3 in. mercury) may be had. Constant pressure is maintained irrespective of air volume, but power consumption is directly proportional to air volume. Thus, half-capacity usage means only half-cost operation. In the larger blower sizes covered by the new line this factor is unusually significant in terms of power economy.

Lamson Corporation's blower for users of large-volume, constant pressure air—industrial vacuum cleaning systems, pneumatic material transport, carburetion for combustion, gas or air circulation, etc.



For more data circle item code number on the postage free post card—p. 17

Frick Company's improved suction valve for refrigeration machines using ammonia.

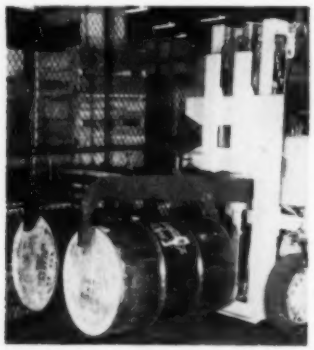
land" type, has moving parts weighing one-sixteenth as much as those in the former poppet valve. In addition, the ring plate has an opening on each side, giving the same port area with about half the lift.

In service, the use of the ring-plate valve often increases the capacity of the compressor. The complete new valve and cage are both lighter and less expensive than the old poppet style.

The new valve is a complete assembly, so designed that no loose parts can get into the cylinder. It is made interchangeable with former poppet valves in Frick ammonia compressors of the vertical enclosed type.

Drum Handler

A-4 THE YALE & TOWNE MANUFACTURING COMPANY, Philadelphia Division, 11,000 Roosevelt Blvd., Philadelphia 15, Pa., has announced a new horizontal drum handling device that can be attached to any industrial fork truck without removing the forks or making any hydraulic or mechanical connections.



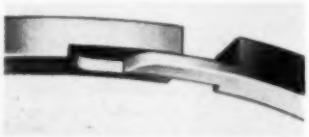
Yale horizontal drum handler permits any industrial truck to carry one or two standard drums without mechanical or hydraulic connection. There is no load on the springs at any time.

Completely automatic, the new device is a self contained unit that fits over the forks and is fixed to them with two screw type clamps. One or two standard drums can be picked up with the drum handler by simply lowering it over them while the truck is slowly backing away. The rear clamps are spring loaded and snap under the lip of the drum. When the drums are lifted, gravity action locks the clamping hooks in place. There is no load on the springs at any time. Depositing the drums is just as easy as picking them up. The drums are lowered, the truck is moved forward (stretching the springs on rear clamps) and as soon as the forward clamps are free, the channels on the truck are tilted back. The truck is then backed away to free rear clamps.

The attachment weighs 270 lb and permits the drums handled to be filled with any common material. Drums may be stacked to any height within the lifting range of the truck.

New Piston Ring Design

A-5 THE SAFETY SEAL PISTON RING COMPANY, Box 106, Fort Worth 1, Texas, announce the production of a new Safety Seal ring, an improved single-piece



Sealing tongue of the new Safety Seal piston ring for diesel, gas and steam engines and compressors. Available in sizes 1 to 30-in. diameter from Safety Seal Piston Ring Company, Fort Worth, Texas.

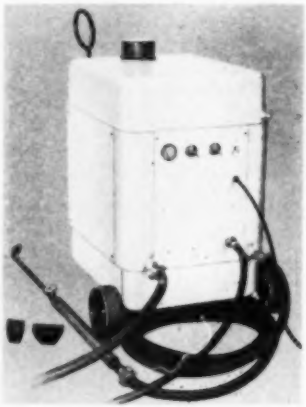
sealing ring capable of handling present day requirements of higher compression and firing pressures in the latest type internal combustion engines.

The sealing member is so designed that outward pressure against the cylinder wall is controlled in such a way that excessive pressures are avoided. With correct and uniform ring-to-cylinder wall pressure maintained at every point around the diameter of the ring, the possibility of scoring and uneven wear on the cylinder liner is thus eliminated.

In the Safety Seal ring the sealing member is permanently bonded to the main body of the ring throughout the entire area of contact instead of only at the base. This prevents vibration of the sealing member, and eliminates the danger of its working loose from the bond and falling into the cylinder.

Steam Cleaner

A-6 HYPRESSURE JENNY DIVISION, HOMESTEAD VALVE MANUFACTURING COMPANY, Coraopolis, Pa., announces a steam cleaner that works on any steam supply of 60 to 150 lb pressure to remove grease and dirt from machinery, equipment and floors.



Homestead Valve's Hypressure Jenny steam cleaner, working on any steam supply of 60-150 lb, supplies 45-90 gph of hot chemical vapor spray.

The new unit is said to clean eight to ten times faster than by bucket-brush-and-scraper or hand-cleaning methods. It mixes steam supply with positive pumped proportions of water and cleaning solution for cleaning, sanitizing, and deodorizing.

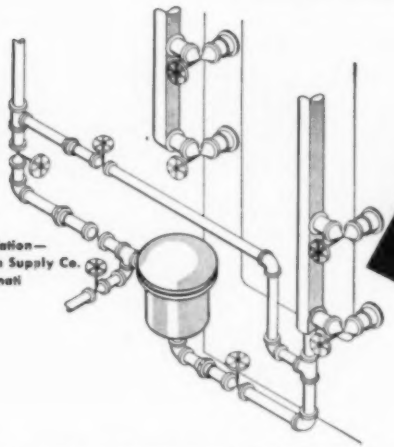
The portable cleaner can be rolled right to the cleaning job. After connecting to steam and water supply lines, and 110 volt, 60 cycle ac lighting circuit, a flick of the starting switch produces anywhere from 45 to 90 gallons per hour of boiling hot chemical vapor spray, as desired by the operator. Where steam supply pressure exceeds 150 lb, the manufacturer advises use of a steam pressure regulator.

The equipment, including 25 feet of vapor hose, cleaning gun with nozzle control system, and nozzles, weighs approximately 240 lb; and measures 37 in. long by 27 in. wide and 37 in. high.

for outstanding service

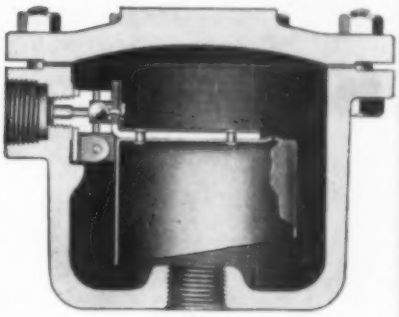
on Heavy-Duty Steam Drying Units

...for example



The installation—
American Linen Supply Co.
Cincinnati

Rely on Dependable CRANE STEAM TRAPS



Crane Inverted Open Float Steam Trap with patented ball-type disc, for 1 to 300 pounds saturated steam working pressures. Literature on request from your Crane Branch or Crane Wholesaler.

PROBLEM: To equip a steam-heated tumbler-type drier with a trap that would reduce start-up time to a minimum, and provide, automatically, a smooth, steady flow of hot, dry steam to the unit, with the lowest possible maintenance cost.

WORKING CONDITIONS: Steam pressure to drier, 125 pounds. Drier operated 16 hours daily on continuous batch basis.

SOLUTION TO PROBLEM: Crane No. 981, ¾-inch, 150-Pound Inverted Open Float Trap, carefully selected for adequate drainage capacity, and properly installed. (Now listed as No. 9810, with patented improved ball-type disc.)

RESULTS: Never requiring any repairs or new parts in more than 8 years' service, this Crane trap has given complete satisfaction. Periodic routine inspection only is total maintenance cost.

...ANOTHER TYPICAL CASE HISTORY demonstrating the better performance... the lower ultimate cost of Crane Valves of all types... and why—

More Crane Valves are used than any other make!

CRANE CO.

General Offices:
836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

Free additional information is available to readers of Southern Power & Industry. Check item number on the postage free service coupon post card—page 17.

Outdoor Motor Controls

A-7 WESTINGHOUSE ELECTRIC CORPORATION, Box 2099, Pittsburgh 30, Pa., has developed new rain-tight outdoor motor control units.

Rain-tight motor control unit by Westinghouse Electric.

The units consist of a combination across-the-line starter with circuit breaker in a rain-tight enclosure, with a built-in start-stop pushbutton or hand-off-auto selector switch. The sheet steel enclosure is treated for maximum corrosion resistance, and is finished in gray enamel. A hinged cover can be swung open or latched and padlocked closed. A neoprene gasket around the edge of the cover and protective shield at the top of the enclosure prevent the entrance of rain. The pushbutton or selector switch, and the reset button also are rain-tight.

A self-indicating slamproof handle is provided for operation of the circuit breaker. This handle has separate positions of on, tripped, off, reset, and open cover, and can be padlocked in the off position by up to three separate padlocks.

The starter and breaker are mounted on a steel panel, permitting the removal of the complete interior as a unit for replacement or servicing. Mounting brackets at the top and bottom of the enclosure permit surface mounting, and a 1¼-in. threaded hub is provided at the top for conduit connections. There are convenient knockouts at the sides and bottom of the enclosure.

When required, one or two control relays, a third overload relay, or a control transformer can be supplied.

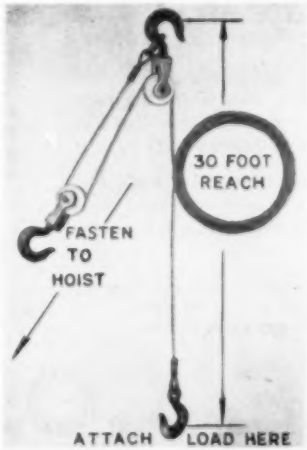
These starters are available in NEMA sizes 1 through 5. Standard voltages are 220 volts and 440 volts, 60 cycles, although with proper coils the starters are suitable for voltages up to 600 volt.

Hoist Accessory

A-8 THE LUG-ALL COMPANY, 331 E. Lancaster Ave., Wynnewood, Pa., is marketing a new 6 lb hoist accessory known as the "Longlift," for use in lifting of pipes, motors, ducting, unit heaters or construction equipment to ceilings or construction locations as high as 30 ft.

The Longlift is normally used in conjunction with the 8½ lb Lug-All hoist. Operation is from the ground. Only the 6 lb attachment need be taken up the ladder for overhead suspension. The light weight is said to make setup faster. Capacity is 750 lb, and minimum distance between hooks is 10 in.

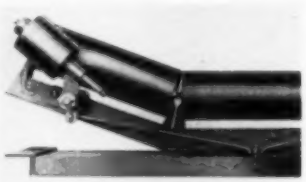
The Longlift may be used with any hoist having a minimum lift of 15 ft.



30 ft lift possible with new 6 lb accessory for the Lug-All hoist.

Belt Training Carrier

A-9 STEPHENS-ADAMSON MFG. Co., Aurora, Ill., has developed a new belt training carrier, which is said to be particularly effective and on most applications need only be installed at intervals of 50-100 feet.



Partial view of Stephens-Adamson's belt train carrier, which responds to the shift of the belt off dead center. Carrier resumes normal position.

The "training rollers" respond instantaneously to any shift of the belt off dead center and tilt the carrier into an angular position with respect to the direction of belt travel. This quickly returns the belt to center and the carrier resumes its normal position. According to the manufacturer, edge wear of belt is negligible with this carrier and its use insures against any possibility of serious belt damage due to improper training.

Submersible Pump

A-10 THE BYRON JACKSON CO., Box 2017, Terminal Annex, Los Angeles 54, Calif., has introduced a small submersible pump designed for small capacities at high heads from wells of 6 in. inside diameter or larger. This pump has a capacity range of from 30 to 130 gpm at heads of from 80 to 770 feet. The motors, available in sizes of 5, 7½, 10 and 15 hp, are 3-phase, 60 cycle, 2-pole, 220/440 volt and have a speed of 3500 rpm. A 50-cycle motor is available at a speed of 2900 rpm. All motors are oil-filled, mechanically-sealed, and capable of operating completely submerged in water.

The submersible unit eliminates the alignment and bearing protection problems of shaft-type installations. The number of moving parts is reduced to a minimum. This pump is designed for a diversity of applications, such as industrial plants municipalities, refineries, canneries, mining, irrigation, and many other uses. Pump is now available in the four motor sizes.

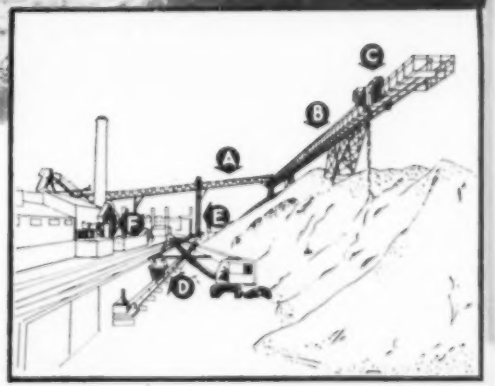
This *Continental* CONVEYOR does "Double Duty"

Another Example of Continental's Belt Conveyors at Work -

The Southern Cement Company's conveying and elevating system in their Birmingham Plant incorporates several advanced features of design—one of which is illustrated above and to the right.

Continental's engineers are skilled in "practical engineering" — the kind that results in installations designed for economical, dependable operation and long life. All Continental products — whether especially designed systems and equipment or standard equipment and accessories — show the value of practical engineering.

• *Call Continental engineers in on your job — or specify Continental on your next replacement order.*



Slag is carried to storage by Conveyors A and B and discharged to storage at any point by self-propelled Tripper, C. As material is needed for processing, it is loaded by shovel onto Reclaim Conveyor D, raised by Bucket Elevator E, and discharged onto return side of Conveyor Belt A., which delivers it to Plant F.

Write for your copy of Continental's new Catalog ID 481, "Continental Belt Conveyors."

CB-8205

INDUSTRIAL DIVISION

CONTINENTAL GIN COMPANY

BIRMINGHAM, ALABAMA

ENGINEERS CGC ATLANTA • DALLAS • MEMPHIS • NEW YORK CGC MANUFACTURERS

For more data circle item code number on the postage free post card—p. 17

Welding Coupling

A-11 TUBE TURNS, INC., 224 E. Broadway, Louisville 1, Ky., announces a new scale-free welding coupling designed to eliminate damaging welding scale from piping systems.

The new Tube-Turn SF (scale-free) welding coupling.

The new scale-free welding coupling consists of two forged halves. The ends of the hubs are prepared for welding to pipe or welding fittings of corresponding sizes. When the two halves of the coupling are brought together, the tongue of one slips into the groove of the other. A circumferential cavity directly beneath the beveled welding area prevents burn-through or the formation of icicles in the interior. The cavity also insulates the interior from the extreme welding heat and prevents scaling.

Advantages pointed out by the manufacturer are: the tongue and groove arrangement makes piping easy to align; the hubs of the coupling are relatively short and any scale or protrusions formed by the two attachment welds can be conveniently reached and removed before coupling is connected; there is no scale to damage equipment; complete penetration is obtained without danger of burn-through or formation of icicles; coupling can be taken apart when piping is to be disassembled, and reused; coupling joint is smooth; when properly welded the joint is leak-proof; reduced maintenance of equipment.

The manufacturer recommends the coupling in connecting piping designed to carry high pressure steam, hydraulic fluids, compressed air, certain chemicals and gasses, lubricating oil, fuel oil, carbonated beverages, and various food products. It is available in sizes from 1¼ in. through 12 in. and in carbon steel, stainless steel, aluminum and other metals and alloys.

Versatile Fork Truck Design

A-12 HYSTER COMPANY, 2902 N.E. Clackamas St., Portland 8, Oregon, have developed new upright assemblies and new load arm pins which permit the use of optional additional counterweight on their standard 2000 lb capacity model, thus increasing or decreasing load center or load capacity as the need requires.

Three basic variations make possible at least six different combinations in the same Hyster Model "20" lift truck:

1. 2000 lb at 15-in. load centers: standard model, has standard integral counterweight built in. (12-in. load centers mean that a 30-in. load of 2000 lb can be safely carried on the forks.)

2. 2000 lb at 24-in. load centers: capacity increased to 2000 lb at 24-in. load centers by additional counterweights installed in the field in a few minutes with 8 capscrews.

3. 1300 lb at 24-in. load centers; lightweight model with skeleton integral counterweight.

4. 1000 lb at 24-in. load centers: lightweight model with no alterations.

5. 2000 lb at 15-in. load centers: lightweight model into standard model by adding counterweights in field.

6. 1500 lb capacity at 24-in. load centers: lightweight model with additional counterweight installed in field.

Lightweight truck is especially applicable for use in older buildings with lighter elevators and limited floor loading capacity. Owner can select counterweight needed for particular type of operation. Removal, when not needed, results in fuel and maintenance economy and saves unnecessary wear and tear on floors.

Hyster standard 2000 lb capacity truck with extra demountable counterweight "pads" on back. Pads weigh 363 lb and are bolted to rear of machine with 8 capscrews.

Collapsible Air Diffuser

A-13 INFILCO INCORPORATED, Tucson, Arizona, has announced a new type of equipment for diffusing air or other gas into a liquid to produce agitation or to effect absorption.

Colaflex air and gas diffuser by Infilco Inc.

The Colaflex Diffuser, as the equipment is called, is a flexible, collapsible diffuser which maintains practically constant permeability for fine diffusion of air or gas in sewage and industrial waste treatment, water conditioning, biological manufacturing processes and absorption processes.

An important feature of the diffuser is the ease with which it can be cleaned and its permeability maintained. The diffusing element is of fabric. Gas or air under pressure inflates the element to an erect, distended position and diffuses through the fabric to the liquid. All that is necessary to clean the fabric is to shut off the gas or air supply by means of the 3-way valve with which the system is provided. The gas or air is suddenly vented to atmosphere and the fabric is collapsed by the pressure of the liquid and inverted downward into its cup. This flexing of the walls dislodges or loosens solid particles that may have accumulated on or in the fabric, and the fabric is kept clean and its permeability maintained.

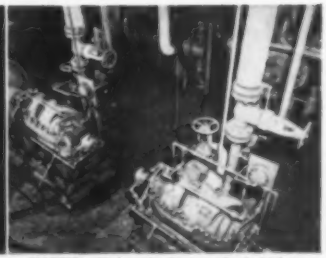
Several diffuser elements can be connected to a common gas duct or header of any desired pattern within the tank in which the liquid is contained.

WALWORTH *Pressure-Seal* VALVES

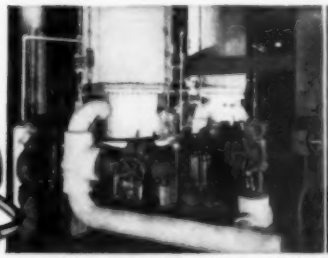
For high-pressure, high-temperature services

Walworth 6-inch Series 900 Pressure-Seal Gate Valve with Series 1300 Y-type Globe Valve on the by-pass.

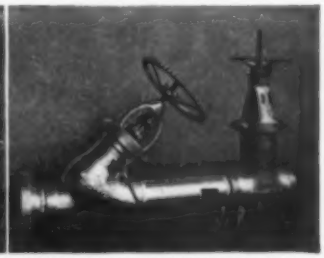
CHEMICAL PLANT: Walworth Pressure-Seal Valves in the pressure reducing station of a chemical plant.



MARINE: Walworth Pressure-Seal Valves aboard the S.S. "Wilfred Sykes"—largest Great Lakes ore carrier.



LIGHT AND POWER: Walworth Pressure-Seal Valves equipped with motor operators, in an eastern public utility plant.



PAPER MILL: Fabricated header with 8-inch Series 600 Pressure-Seal Y-Globe Non-Return Valves and Series 600 Pressure-Seal Gate Valve.

SMALL VALVES FOR HIGH PRESSURE-TEMPERATURE SERVICE

Series 1500 Cast Steel Y-type Globe and Angle Valves in sizes ¼ to 2 inches.

The bonnet and body design of Walworth Pressure-Seal Valves is such that the pressure within the valve is used to prevent leakage at the junction of the bonnet and body. The bonnet joint of the Walworth Pressure-Seal Valve is permanently tight because there is no dependency on the ability of any component part of the joint to resist creep during long exposure to high temperature. Sudden temperature and pressure changes do not affect this tightness. Bonnet flanges and studs are eliminated and the weight of the valve is reduced.

An improved flexible disc design maintains seat tightness, even when the valve body is distorted by pipeline stresses or by temperature and pressure changes. This improved disc design makes it easier to open and close this valve.

Walworth Pressure-Seal Valves are easy to disassemble and assemble, and are the most satisfactory valves for high-pressure, high-temperature service. They are available in Series 600, 900, 1500, 2500 and in a wide range of sizes and types. For further information, write for Circular 116.

WALWORTH

valves • fittings • pipe wrenches

60 EAST 42nd STREET, NEW YORK 17, N. Y.

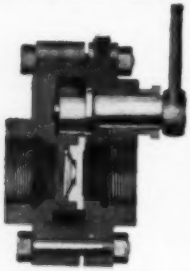
DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

EVERLASTING VALVES

Mean "Everlasting" Protection on these duties

GENERAL SERVICE

Wherever frequent use and quick operation is required for any liquid or gas at pressures up to 300 psi. These valves have outside stuffing box and gland.



STEAM JACKETED

Assure continued free flow of any material which congeals at ordinary temperatures.

FIRE PROTECTION

Closing type for inflammable liquid emergency shut-off, or opening type for deluge or drainage, assuring immediate and positive action with weighted pendulum stop.

BOILER BLOW-OFF

Quick-opening, also hand-wheel operated. Angle and "Y" types and combination units meeting ASME Code requirements for pressures up to 900 psi.

BOILER WATER COLUMN

With indicator and locking device. Meets ASME Code requirements.

EVERLASTING FEATURES

For more than 40 years, EVERLASTING VALVES have been known for their ingenious design, simple sturdy construction, and long trouble-free life with low maintenance expense. Some of their distinctive features are:

Quick-Action . . . opened or closed with less than a quarter turn of the operating lever.

Straight-Through Flow . . . the disc cannot become loose and accidentally check the flow.

Drop-Tight Seal . . . constant contact of disc and seat at all times prevents dirt or scale from getting between.

Self Regrinding . . . the disc rotates on the seat with each operation, thus regrinding the sealing surfaces.

No Wedge Action . . . all parts move between parallel faces.

Write for bulletin describing* EVERLASTING VALVES *in detail.

EVERLASTING VALVE COMPANY 49 Fisk Street, Jersey City 5, N. J.

Everlasting Valves

Trade-Mark "EVERLASTING" REG. U. S. PAT. OFF.

for everlasting protection

new equipment (continued)

Industrial Switch

A-14 GENERAL CONTROL COMPANY, Boston 34, Mass., has developed for industrial use a new maintained-position switch known as the type "A-C-O" switch.

Operation is such that the first press transfers the contacts, and the second press restores them. Single-pole, double-throw contacts permit adaptation of this switch to either normally closed or normally open circuits. Unusually fast switching is permitted by the return-action design of the operating plunger mechanism, which is insulated from the contacts.

General Control Co.'s new Type A-C-O Switch.

Mounting is either single hole mounting by means of a ½" threaded bushing, or top or side panel mounting with clearance holes for 6-32 screws. Overall dimensions are 2" wide, 2 25/32" high including plunger, 1 3/32" deep. The switch is supplied with a cover enclosing the mechanical parts.

Contacts are rated at 20 amp, 125 volts a-c, non-inductive. Wide-spaced terminals with barriers reduce wiring problems.

Low-Lift Electric Truck

A-15 THE RAYMOND CORPORATION, 9084 Madison St., Greene, N. Y., formerly LYON-Raymond Corporation, has added to its line of electric trucks a

(*Continued on page* 114)

4 ways to know your combustion efficiency

The ever-increasing pressure for fuel economy makes some type of "combustion guide" instrument an essential part of any modern fuel burning operation. Hays offers the most complete line of such instruments in the industry—adaptable to your cost and engineering requirements. Your particular needs with regard to price, accuracy, speed of response, etc., will determine your choice—however, whatever your needs, Hays has the instrument.

Select your combustion guides *from the most complete line in the industry*

1

HAYS MAGNOTHERM
O_2 METER

Measures fundamental indicator of combustion efficiency —Oxygen. Electronic in operation, with all of the most advanced features incorporated into its design, it is applicable not only to power plant conditions but also to a host of process problems such as catalytic crackers, open hearths, process heaters, inert gases, etc.

PRINCIPLE

Based on paramagnetic (attracted by magnetism) properties of oxygen. All other gases usually encountered are slightly diamagnetic (repelled by magnetism).

FEATURES

Highly sensitive to change in O_2 content
Rapid response to change in O_2 content
Electrically operated
Electronic type recorder
Temperature controlled
Pressure compensated
No liquid or gaseous fuel required to be added
No chemicals
High accuracy maintained
Not affected by wide change of gas flow rate
Continuous sampling and recording
Glass and corrosive resistant sampling system
Remote mounted analyzer
Remote mounted recorder
12" 24-hour chart
O_2 recorder and indicator
4 records on same chart possible
Low maintenance

2

HAYS CONDU-THERM
CO_2 METER

Meter incorporates all of the construction and manufacturing ideas which Hays has developed during many years of experience in gas analysis. A deluxe instrument, the Condu-Therm CO_2 Analyzer is especially applicable to the larger boiler plants and to industrial processes.

PRINCIPLE

The principle of operation used in the Hays Condu-Therm Meter is that of thermal conductivity of gases, i.e., that all gases conduct heat at different rates.

FEATURES

Electrically operated
Electronic type recorder
Temperature controlled
Humidity controlled
No chemicals required
No moving parts in analyzer
Continuous sampling
No drying agent required
Easily installed glass and corrosion resisting sampling system
Not affected by wide change in gas flow rate
Rapid response
High sensitivity
Continuous recording
Remote mounted analyzer
Remote mounted recorder
12" 24-hour chart
CO_2 Recorder and Indicator
As many as 4 records on same chart
Low maintenance

3

HAYS COMBUSTION
METER

Hundreds of these meters have been in operation for many years in all types of plants burning all kinds of fuels and saving thousands of fuel dollars.

PRINCIPLE

Operates on Orsat principle of Volumetric measurement and chemical absorption. Extremely simple sample of flue gas trapped and accurately measured, passed through chemical which removes CO_2 component of gas mixture. Sample is re-measured, volume compared to original sample. Difference before and after absorption gives exact percentage of CO_2 absorbed by chemical.

FEATURES

Low price
Water operation
Pressure and temp. compensated
Volumetric determination
Chemical absorption
2 minute operating cycle
Easily understood
Rugged construction
Low maintenance
Available in 6 remote mounted types and 3 integral types
Remote or integral mounting
10" 24-hour chart
Available for: (a) CO_2 only—recording with or without indicator (b) CO_2 and flue gas temperature recorder combined (c) CO_2, draft or flue gas temperature recorder combined

4

HAYS-PENN BOILER
EFFICIENCY METER

Provides a QUANTITATIVE guide to efficiency — deals with quantities of air and steam; by contrast CO_2 and O_2 meters are QUALITATIVE guides since they determine directly quality of combustion gases. Both Boiler Efficiency Meter and Gas Analysis Meter are used to obtain advantages of both methods.

PRINCIPLE

Pounds of air required to burn each pound of coal vary widely with heating value of coal; constant weight of air is required to produce same Btu. Similar relationship exists when oil and natural gas are used as fuels. Record of steam flow is assumed to be Btu's produced; record of air flow is calibrated to flow of air required to generate that steam.

FEATURES

Electric operation of flow meter and air flow recorder
Diaphragm type air flow measuring unit
Air flow measuring element does no work
Air flow recorder—motor operated
Adjustable cam air flow calibration
Mercury transmitter—pressures to 2500 psi
Interchangeable range tubes for steam flow
Remote mounted steam flow transmitter
No high pressure piping into panel
Easily installed and adjusted
Low maintenance

THE **HAYS** CORPORATION

MICHIGAN CITY 4, INDIANA

Automatic Combustion Control • Boiler Panels • Hays-Penn Flowmeters
Veriflow Meters and Veritrol • Gas Analyzers • Draft Gages
Combustion Test Sets • CO_2 Recorders • Electronic Oxygen Recorders

NEWS for the South and Southwest

Godshalk Resigns from SCE&G; Moves to Kansas City P. & L.

Resignation of E. L. GODSHALK as executive vice president and a director of the SOUTH CAROLINA ELECTRIC AND GAS COMPANY, and appointment of J. M. COSTELLO to succeed him, has been announced.

HAROLD A. PETIT, of Charleston, has been named vice president and will assume Mr. Godshalk's position as Charleston division manager.

Mr. Godshalk resigned to accept an offer from the Kansas City Power & Light Company to become vice president in charge of operations.

A veteran of 32 years in the utility field, Mr. Costello has served as financial vice president and as a director of SCE&G since 1946. He will continue as a director and as financial administrator of the company.

Mr. Petit, has been associated with the Charleston utility business continuously for the past 34 years.

Dowell Promotes Polk

A. C. POLK, JR., Assistant Manager of DOWELL INCORPORATED, TULSA, OKLA., has been named General Manager. Mr. Polk is also a member of the Board of Directors. He has been with Dowell since July, 1941.

A. C. Polk, Jr. appointed general manager of Dowell.

Before his promotion to assistant manager in 1948, he was located in HOUSTON as District Manager. Previous to that, he had been with Dowell in LEVELLAND, TEX., SHREVEPORT, and LAFAYETTE, LA.

Dowell is a nationally-known organization engaged in the application of chemical services to the petroleum industry and in maintenance cleaning of industrial equipment.

Childers Mfg. Co.—Atlanta

CHILDERS MFG. CO., HOUSTON, TEXAS, announces the appointment of JOHN F. TEMPLETON to handle sales of their aluminum pipe jacketing in GEORGIA, ALABAMA, and north FLORIDA.

Mr. Templeton's headquarters are 901 William Oliver Building, Atlanta, Georgia. He is well known in this area where he has handled sales of boiler insulation and covering since 1949. Previously he was engaged in consulting and design work on power piping problems for more than 15 years.

Plymouth Cordage—New Division

PLYMOUTH CORDAGE COMPANY announces a new paper twisting division which will market a line of products under the trade name PlymKraft. These paper products, which embrace more than forty different items, are now being manufactured in the new, modern paper-twisting division of the Plymouth Cordage Company at its plant at Plymouth, Massachusetts.

The PlymKraft line includes cable filler, tissue cords, paper-wrapped glass twines, chair seat cords, wool twines, weatherstripping, welting cords, seaming cords, cheese twines and many specialties.

Twisted paper products are used in a wide range of industries; automotive, aviation, building, electrical equipment, electronics, furniture, paper bags, refrigeration, tobacco, weatherstripping, wool, wire rope, radio, clothing, rugs and many others.

A.S.M.E. Elects Pigott

REGINALD J. S. PIGOTT, director of the engineering division of Gulf Research and Development Co., Pittsburgh, a subsidiary of Gulf Oil Corp., has been elected president of THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS for 1952. Mr. Pigott succeeds J. Calvin Brown of Los Angeles.

Regional vice presidents elected were: WILLIS F. THOMPSON, chief mechanical engineer, Westcott & Mapes, Inc., New Haven, Conn.; ERNEST H. HANHART, consulting mechanical engineer, Baltimore, Md.; ERNEST S. THEISS, assistant chief engineer, Davey Compressor Co., Kent, Ohio, and SAMUEL H. GRAF, director, Engineering Experimental Station, Oregon State College, was reelected.

FUTURE EVENTS Of Engineering Interest

LOUISIANA ENGINEERING SOCIETY, J. P. Fernandez, Sec'y-Treas., 9011 Apple St., New Orleans 18, La.
Jan. 10-12, Meeting, St. Charles Hotel, New Orleans, La.

PLANT MAINTENANCE SHOW, Clapp & Poliak, Inc., 341 Madison Ave., New York, N. Y.
Jan. 14-17, Industrial Exposition, Convention Hall, Philadelphia, Pa.

SOCIETY OF AUTOMOTIVE ENGINEERS, John A. C. Warner, Sec'y, 29 West 39th St., New York, N. Y.
Jan. 14-18, Annual Meeting, Detroit, Mich.

SOCIETY OF PLASTICS ENGINEERS, J. H. DuBois, Nat'l Pres., 160 Cott St., Irvington, N. J.
Jan. 16-18, National Conference, Chicago, Ill.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, B. H. Henline, Sec'y, 33 West 39th St., New York 18, N. Y.
Jan. 21-25, Winter General Meeting, Hotel Statler, New York, N. Y.

AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS, Edward H. Robie, Sec'y, 29 West 39th St., New York 18, N. Y.
Feb. 18-21, Annual Meeting, New York, N. Y.

SOUTHERN SAFETY CONFERENCE AND EXPOSITION, B. B. Carr, Exec. Dir., 2120 First Ave. N., Birmingham 3, Ala.
Mar. 2-4, Biltmore Hotel, Atlanta, Ga.

AMERICAN SOCIETY FOR TESTING MATERIALS, C. L. Warwick, Exec. Sec'y, 1916 Race St., Philadelphia 3, Pa.
Mar. 3-7, Spring Meeting and Committee Week, Cleveland, Ohio.

NATIONAL ASSOCIATION OF CORROSION ENGINEERS, A. B. Campbell, Exec. Sec'y, 919 Milan Bldg., Houston 2, Texas.
Mar. 10-14, Bucaneer Hotel, Galveston, Texas.

THE SOCIETY OF THE PLASTICS INDUSTRY, INC., Wm. T. Cruse, Exec. V.P., 295 Madison Ave., New York 17, N. Y.
Mar. 11-14, Fifth National Plastics Exposition, Exposition Hall, Philadelphia, Pa.

AMERICAN SOCIETY OF TOOL ENGINEERS, Harry E. Conrad, Exec. Sec'y, 10700 Puritan Ave., Detroit 21, Mich.
Mar. 17-21, Industrial Exposition, Chicago, Ill.

ILLUMINATING ENGINEERING SOCIETY, A. Dexter Hinckley, Exec. Sec'y, 51 Madison Ave., New York 10, N. Y.
Apr. 6-8, Southwestern Regional Conference, Hotel Tulsa, Tulsa, Okla.
Apr. 20-22, Southern Regional Conference, Hermitage Hotel, Nashville, Tenn.

AMERICAN SOCIETY OF LUBRICATION ENGINEERS, W. F. Leonard, Sec'y, 343 S. Dearborn St., Chicago 4, Ill.
Apr. 7-9, Statler Hotel, Cleveland, Ohio.

Newly elected directors-at-large are ALBERT C. PASINI, superintendent production department, The Detroit Edison Co., and PAUL B. EATON, head, mechanical engineering department, Lafayette College, Easton, Pa.

Reginald J. S. Pigott, director of engineering division, Gulf Research & Development Co., Pittsburgh and 1952 A.S.M.E. president.

Engineering awards made at the 72nd annual meeting included: WILLIAM L. BATT, minister in charge of the Economic Cooperation Administration Mission to the United Kingdom—the Hoover Medal; ERVIN G. BAILEY, V. P., The Babcock and Wilcox Co.—the John Fritz Medal; and THOMAS ROY JONES, Pres., Daystrom, Inc. — the Henry Laurence Gantt Medal.

The ASME Medal, highest award of The American Society of Mechanical Engineers, was presented to GLENN B. WARREN, general manager, Turbine Divisions, General Electric Company, for "leadership in the science and art of turbine designs."

Shell Chemical—Atlanta

SHELL CHEMICAL CORPORATION has opened a new sales office in ATLANTA, GEORGIA.

M. W. ELLISON, the new District Manager, is a native of MONTGOMERY, ALABAMA. With Shell Chemical since 1946, he is a graduate in chemistry from the University of Alabama. Aided by a staff of technically trained salesmen, Mr. Ellison will administer Shell Chemical sales activities in the states of VIRGINIA, the CAROLINAS, GEORGIA, FLORIDA, ALABAMA and TENNESSEE.

M. M. Ellison, manager of the Atlanta, Georgia, sales district of Shell.

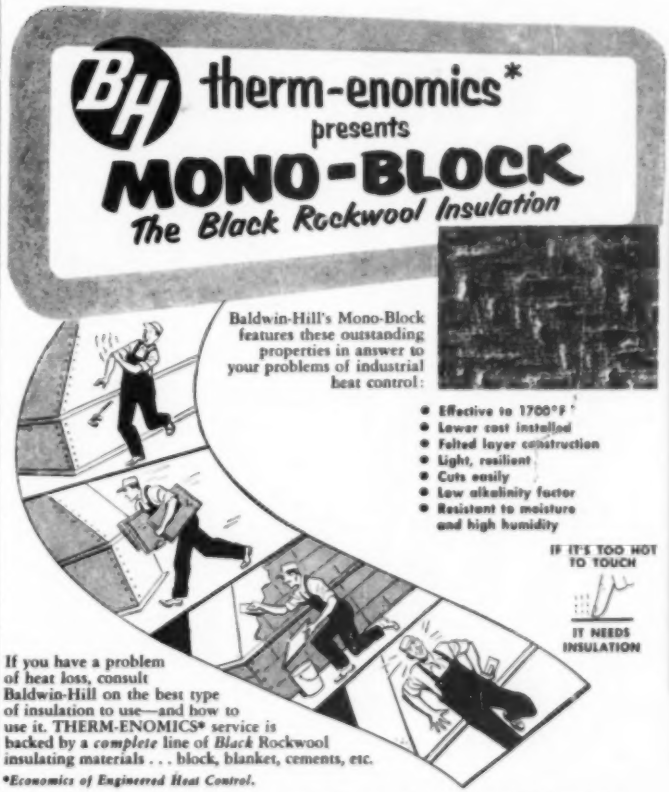
E. L. Dennis—New Orleans

E. L. DENNIS ENGINEERING COMPANY has announced a change of address from its former location on Camp Street to 5301 Canal Boulevard, NEW ORLEANS 19, LOUISIANA.

Charlotte Representative for Kroog

ROBERT L. CARLSON has recently been appointed to represent A. C. KROOG CO. in the NORTH CAROLINA and SOUTH CAROLINA area. Mr. Carlson's address is 530 Sedgefield Road, Charlotte, N. C.

The A. J. Kroog Co. of Atlanta is headed by Al Kroog and represents manufacturers of power, water, sewage, and industrial equipment in the Southeast.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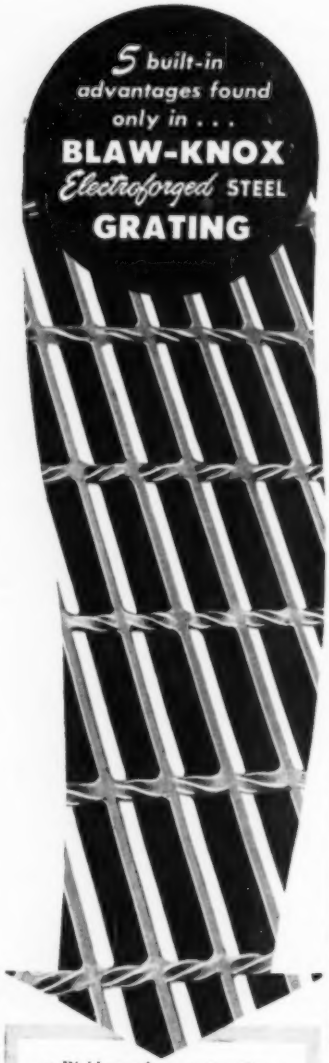
therm-enomics*
presents
MONO-BLOCK
The Black Rockwool Insulation
Baldwin-Hill's Mono-Block features these outstanding properties in answer to your problems of industrial heat control:
• Effective to 1700°F
• Lower cost installed
• Felted layer construction
• Light, resilient
• Cuts easily
• Low alkalinity factor
• Resistant to moisture and high humidity
IF IT'S TOO HOT TO TOUCH
IT NEEDS INSULATION
If you have a problem of heat loss, consult Baldwin-Hill on the best type of insulation to use—and how to use it. THERM-ENOMICS* service is backed by a complete line of Black Rockwool insulating materials . . . block, blanket, cements, etc.
*Economics of Engineered Heat Control.
Baldwin-Hill
Black Rockwool
clip this coupon and attach to your signed letterhead
SEND ME COMPLETE INFORMATION ON:
☐ Mono-Block—for temperatures to 1700°F
☐ Blankets—metal reinforced, large-area coverage to 1200°F
☐ No. 1 Cement—plastic insulation, to 1800°F
☐ Powerhouse Cement—high-adhesion finishing to 1700°F
8231
BALDWIN-HILL CO., 681 BREUNIG AVE., TRENTON, N. J.

5 built-in advantages found only in . . .
BLAW-KNOX Electroforged STEEL GRATING



1 Rigid one-piece construction—easy to install.
2 Maximum open area for light and air.
3 Easy to paint — all surfaces accessible.
4 Non-slip Twisted Cross-Bar.
5 Self-cleaning—no sharp corners to clog.

Blaw-Knox Grating Has Them All!

WRITE FOR BULLETIN 2365

BLAW-KNOX DIVISION
OF BLAW-KNOX COMPANY
2034 Farmers Bank Bldg.,
Pittsburgh 22, Pa.
Offices in Principal Cities

news for the South and Southwest (continued)

Nichols Wire & Aluminum Open Atlanta Sales Office

MR. EDWARD C. MANIX, general sales manager of the NICHOLS WIRE & ALUMINUM CO., Davenport, Iowa, announces the appointment of MR. WALTER WALSH as sales manager of its Southeastern division and the opening of a division sales office at 1429 Peachtree St., N.E., ATLANTA, GEORGIA.

Walter Walsh, Southeastern sales manager for Nichols Wire & Aluminum.

Prior to his association with Nichols, Mr. Walsh was assistant to the president of Kaiser Industries, Washington, D. C. He was also with Owens Illinois Glass Co. as sales representative.

Lamson Corp.—Houston

THE LAMSON CORPORATION, Syracuse, N. Y., announces the expansion of its HOUSTON technical staff by the addition of WILLIAM O. REESE, Registered Engineer. Lamson manufactures conveyors, pneumatic tube systems, automatic pallet loaders and blowers. The Houston office, established recently, brings Lamson engineering know-how direct to the Houston area.

Reese, to learn the latest materials handling techniques, completed an intensive training program with Lamson's home-office engineers before taking over his field engineering activities in Houston.

Before he joined Lamson, Reese had both design and field-service experience. He formerly worked for Wyatt Metal and Boiler Works and J. R. Dowell & Co. He is a Mechanical Engineering graduate from Texas Agricultural and Mechanical College and taught Industrial Safety at the University of Houston.

William O. Reese joins Houston staff of Lamson Corporation.

Stott Joins U.S. Gasket

The UNITED STATES GASKET COMPANY, Camden, New Jersey, has appointed HARRY S. STOTT General Sales Manager of both their Gasket and Packing Division and their Fluorocarbon Products Division. Mr. Stott formerly was Sales Manager of Raybestos-Manhattan's Packing Division.

Cummins Diesel—Atlanta

R. P. PARSHALL, former Manager of the Milwaukee branch, CUMMINS DIESEL SALES CORPORATION, Chicago, has joined the Cummins regional organization, as Manager, Southeastern Region, with headquarters at ATLANTA, GEORGIA.

In addition to Parshall, personnel at the Atlanta Regional office includes: B. C. SEARS, Assistant Regional Manager, and NORMAN GRIMES, Regional Service Representative.

Guth Representatives—Md., D.C., Va.

Announcement is made of the appointment by THE EDWIN F. GUTH CO., ST. LOUIS, of the firm of DOUTY & DOWNIE, as Sales Representatives for the States of MARYLAND and VIRGINIA, as well as for WASHINGTON, D. C.

PAUL DOUTY and CAL DOWNIE are experienced lighting men and are equipped to render detailed layout suggestions. They make their headquarters in Baltimore.

G. E. Welding Distributor—Ga.

THE WELDING SUPPLY AND SERVICE COMPANY, MACON, GA., has been appointed as a distributor for G-E electrodes, welders, and accessory items in the Macon area, it was announced recently by GENERAL ELECTRIC'S WELDING DEPARTMENT.

A G-E welding distributor in Atlanta for many years, the Welding Supply and Service Co. began operating from their new store in Macon on November 1, 1951.

It's VULCAN

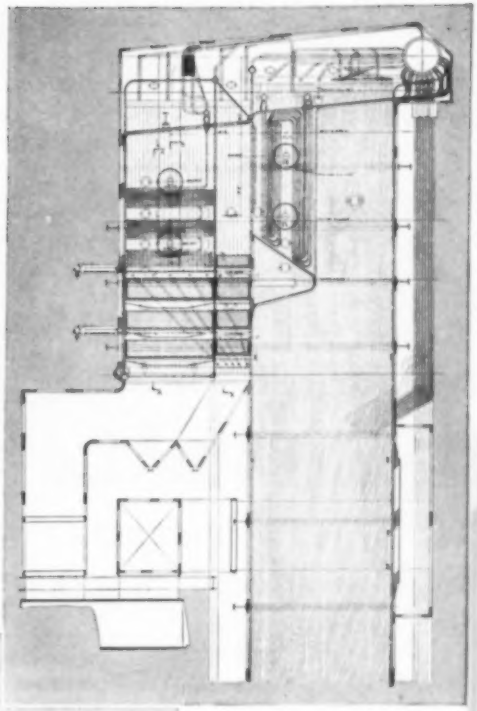
for the FIRST

1,370,000

pounds-per-hour boiler

HUDSON AVENUE STATION

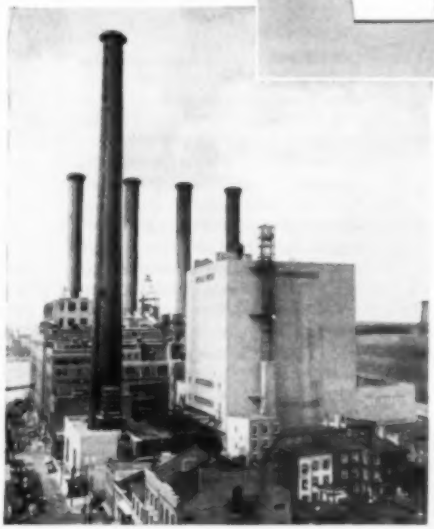
CONSOLIDATED EDISON COMPANY OF NEW YORK



FOR the eighth time, Consolidated Edison Company of New York—world's largest public utility—has purchased Vulcan to keep an important boiler free from soot and slag. This time it's for Hudson Avenue Station, where the world's first 1,370,000-pounds-per-hour boiler is being erected.

The Vulcan Automatic-Sequential Soot Blowing System includes eighteen long retractables and two special air-heater cleaners all air-driven, all to blow with steam.

Whether you prefer to blow with air or steam, depend on Vulcan for optimum cleaning efficiency with low operating and maintenance costs. Let a Vulcan engineer show you how and why.



- B & W Radiant-Type Boiler fired with pulverized coal. Rated at 1,370,000 pounds of steam per hour at 1700 psi and 1050° F.
- 18 Vulcan long retractables, air driven, blow with steam under automatic sequential control.

Showing structural work in progress at Hudson Avenue Station for one of the world's largest boilers.

VULCAN SOOT BLOWER DIVISION

Continental Foundry & Machine Company

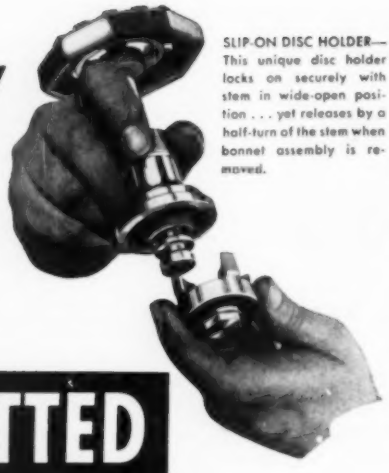
DUBOIS, PENNSYLVANIA

VULCAN *Automatic Soot* **BLOWERS**

KENNEDY

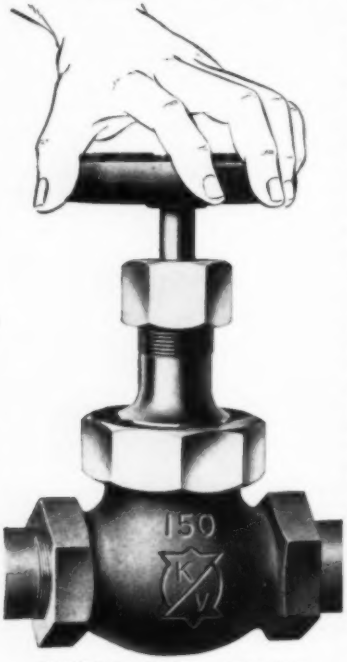
bronze globe valves...

JOB-FITTED



SLIP-ON DISC HOLDER—This unique disc holder locks on securely with stem in wide-open position . . . yet releases by a half-turn of the stem when bonnet assembly is removed.

for longer service, easier maintenance



KENNEDY Fig. 89, Bronze Globe Valve 150 lbs. steam, 300 lbs. WOG, non-shock

YOU KEEP MAINTENANCE COSTS DOWN with KENNEDY Bronze Valves because they are *job-fitted*—every valve specially designed and engineered for the job it has to do.

THE KENNEDY FIG. 89, for example, is designed for services where frequent inspection, cleaning of internal parts and quick renewal of the composition disc are required.

HEAVY UNION BONNET RING permits easy dismantling and reassembly of the valve without risk of damage to body-bonnet bearing surfaces.

RENEWABLE COMPOSITION DISCS are available in a variety of materials to meet a wide range of fluid, pressure and temperature requirements.

RUGGED BODY has an unusually high seat to prolong disc life by utilizing full thickness of disc before disc-holder strikes the base of the raised seat.

LONG-WEARING PACKING—molded rings of lubricated asbestos—maintains easy operation and tight seal to prevent leaks. Valve can be repacked under pressure.

FOR BEST RESULTS and real economy, standardize on KENNEDY Bronze Valves . . . and the complete line of KENNEDY Iron Valves, Malleable, Cast-Iron and Bronze Pipe Fittings.

Write for Circular 101—Buy from Your Local Distributor

Est. 1877

THE **KENNEDY**

VALVE MFG. CO. • ELMIRA, N.Y.

VALVES • PIPE FITTINGS • FIRE HYDRANTS

Westinghouse—Wheeling, Fairmont

ROBERT E. FERRY has recently been appointed manager of apparatus sales offices in WHEELING and FAIRMONT, WEST VIRGINIA, for WESTINGHOUSE ELECTRIC CORPORATION.

Mr. Ferry will be located in the National Bank of West Virginia building, in Wheeling.

Metallizing Engineering—New Orleans

JULIUS H. NILL has been appointed Southern regional manager, METALLIZING ENGINEERING CO., INC., with offices at NEW ORLEANS, LA. He has been connected with the firm since 1945. Prior to his new appointment he was Field Engineer, handling sales in the Middle and Southern Atlantic states.

Durkee-Atwood—South, SW

DURKEE-ATWOOD COMPANY, Minneapolis, has announced the appointment of the following companies as exclusive industrial V-belt distributors in their respective areas: MISSISSIPPI BEARINGS, INC., JACKSON, MISSISSIPPI; H. A. BUSBEE COMPANY, OCALA, FLORIDA; B. L. MONTAGUE COMPANY, CHARLESTON, SOUTH CAROLINA; TURNER CHAIN & BELTING COMPANY, Sales Offices in DALLAS, TEXAS, and OKLAHOMA CITY, OKLAHOMA.

Cleco—Norfolk, Va.; Jacksonville, Tex.

THE CLECO DIVISION of the REED ROLLER BIT COMPANY, HOUSTON, TEXAS, has announced the appointment of R. W. HUDGINS & SONS, 1-3 Commerce Street, NORFOLK 10, VIRGINIA, and CHEROKEE TOOL & SUPPLY COMPANY, JACKSONVILLE, TEXAS, as distributors for Cleco products in their areas.

Allis-Chalmers—Shreveport

AL CHALUPNIK, electrical engineer with ALLIS-CHALMERS MANUFACTURING COMPANY since 1948, has been assigned to the company's SHREVEPORT district office as a sales representative. Chalupnik is an electrical engineering graduate of the University of Kansas.

Yale & Towne—W. Va.

The appointment of BAKER EQUIPMENT ENGINEERING COMPANY as representatives for materials handling machinery in the Charleston, W. Va., marketing area was announced by the YALE & TOWNE MANUFACTURING COMPANY'S Philadelphia Division.

From offices in CHARLESTON, HUNTINGTON, BLUEFIELD and CLARKSBURG, sales engineers of Baker will serve industry in the selection and application of materials handling equipment. Headed by Charles Foutche president, Baker maintains a central office at 404 Morris Street, Charleston.

Colonial Broach Co.—New Orleans

THE OLIVER H. VAN HORN COMPANY, INC., 1742 St. Charles Avenue, NEW ORLEANS 1, LOUISIANA, has been appointed representative to handle distribution and sales engineering in LOUISIANA and MISSISSIPPI on broaching machines, broaches, and broach sharpening equipment, produced by COLONIAL BROACH COMPANY, Detroit.

The Van Horn Company has branch offices in BATON ROUGE and SHREVEPORT, LOUISIANA and HOUSTON, TEXAS.

Kennametal—Tenn., Ala.

KENNAMETAL, INC., Latrobe, Pa., announces the appointment of KENNETH TROMBLEY to the new TENNESSEE and ALABAMA sales district, with headquarters at 18 Clearview Avenue, Chattanooga.

Georgia Marble Acquires Rockwood Limestone

THE GEORGIA MARBLE COMPANY has announced the purchase by its subsidiary, the ALABAMA LIMESTONE COMPANY, of the entire physical assets of the ROCKWOOD ALABAMA STONE COMPANY.

Acquisition of these holdings is a move in expansion on the part of Georgia Marble and is in line with a long recognized need in its expanding business for both marble and limestone quarries and complete manufacturing facilities available for fine structural work and other uses.

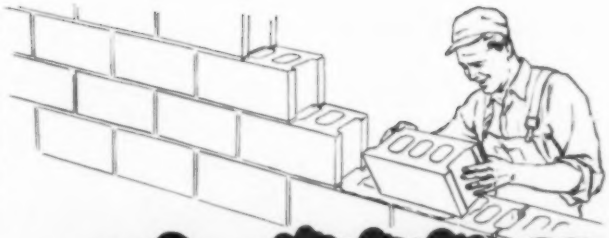
Woodward Iron Addition—Ala.

An engineering and construction contract for an addition to the boiler plant of the WOODWARD IRON COMPANY, WOODWARD, ALA., was awarded to THE RUST ENGINEERING COMPANY, Birmingham.

The contract involves a new 125,000 pph boiler together with auxiliaries including a 500,000 pph feedwater heater and clarifier, with instruments, controls and piping.

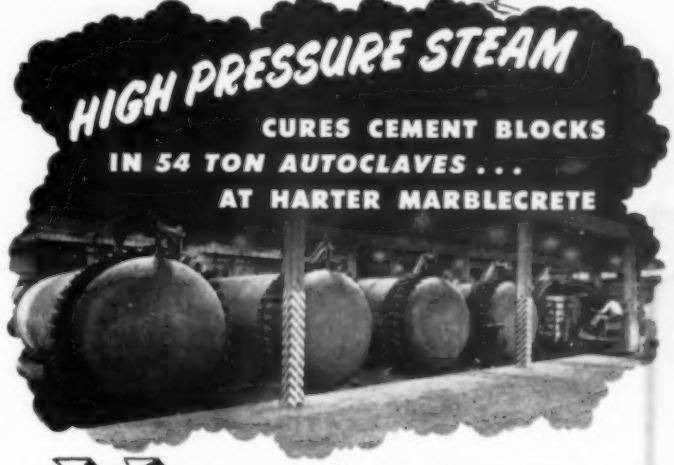
The chimney, designed to serve both the new installation and a proposed boiler of similar capacity, will be constructed of radial brick.

The new boiler and its auxiliaries is designed for operation at 415 psig 600 F total temperature.



HIGH PRESSURE STEAM

CURES CEMENT BLOCKS IN 54 TON AUTOCLAVES . . . AT HARTER MARBLECRETE



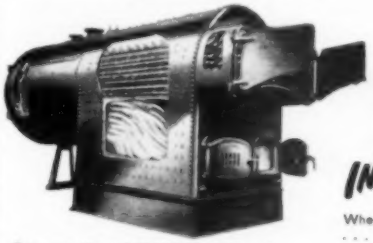
KEWANEE

HEAVY-DUTY BOILER

• In the modern plant of Harter Marblecrete Stone Co., at Oklahoma City, cement blocks are cured with high-pressure steam at 135 to 150 psi in five of the *largest autoclaves ever built.* (Pictured above)

A further interesting fact about this outstanding development is the use of a 26-inch vacuum, pulled with an Elliott barometric condenser, for the drying stage.

High pressure steam is provided by a gas fired 300 hp Kewanee Boiler producing 10,500 pounds of steam per hour.



Cut-a-way View of KEWANEE "500" used in Harter Marblecrete Plant. Sizes for 40 to 304 hp . . . 100-150 psi

FOR HEATING, POWER AND INDUSTRIAL PROCESS STEAM

Wherever steam is needed . . . high or low pressure . . . there is a Kewanee Boiler just right. Ask for complete catalogs and information.

KEWANEE BOILER CORPORATION
KEWANEE, ILLINOIS
Eastern District Office: 40 West 40th Street, New York City 18
Division of American Radiator & Standard Sanitary Corporation

Leading American Brand Bookings

KEWANEE BOILERS

Serving home and industry

news of the South and Southwest (continued)

Kaiser Aluminum Expansion

KAISER ALUMINUM & CHEMICAL CORPORATION has announced plans to double its aluminum reduction plant and power facilities now under construction in the NEW ORLEANS area. Expansion plans call for increasing the capacity of the new plant to a total of 200,000 tons of primary aluminum a year; building additional power facilities, utilizing natural gas as fuel; increasing the capacity of the corporation's alumina plant at Baton Rouge, Louisiana; and to add facilities to increase bauxite production at Kaiser Aluminum's deposits now being opened in Jamaica.

Cost of these additional facilities, together with improvements at other Kaiser Aluminum facilities, is placed at approximately $100,000,000.

Wagner's Transformer Field Service Truck

In order to supplement its transformer service facilities, the Electrical Service Division of WAGNER ELECTRIC CORPORATION has placed in operation a special truck unit equipped to handle practically all types of power transformer field service, including assembly of new transformers which may be shipped partially disassembled. This mobile unit will make available to users of Wagner transformers a specialized field service not heretofore obtainable.

New transformer field service truck of Wagner Electric.

The truck was built with a coach-type body, to protect the occupants and equipment from the weather. The entire truck body is heated, and many of the transformer field service operations can be performed inside regardless of weather conditions.

To facilitate installation or removal of bushings, radiators, conservators and other auxiliary equipment, the truck is equipped with a 6000 lb power-driven cab-controlled winch and a 30 ft telescoping steel gin pole. A rotary compressor, which furnishes compressed air for the truck's brakes, also supplies the compressed air for pressure testing of transformers. The compressor is also used as a vacuum pump for removing air bubbles and pockets from transformer liquid, and is frequently used during drying out operations.

Inside the truck is complete equipment for testing and servicing transformers. The truck also carries its own welding generator, and a 60 cycle, 110/220 volt, 1 phase generator which makes the service unit entirely independent of any outside power source.

C. H. Wheeler, Economy Pumps Consolidate

THE ECONOMY PUMP DIVISION OF HAMILTON-THOMAS CORP., Hamilton, Ohio, is being consolidated with the C. H. WHEELER MANUFACTURING COMPANY, Philadelphia, Pa.—another division of the corporation. Production, engineering and sales departments of Economy are being moved from Hamilton, Ohio, to the Philadelphia plant. Economy Pumps will henceforth be known as Wheeler-Economy Pumps.

Plant Maintenance Show

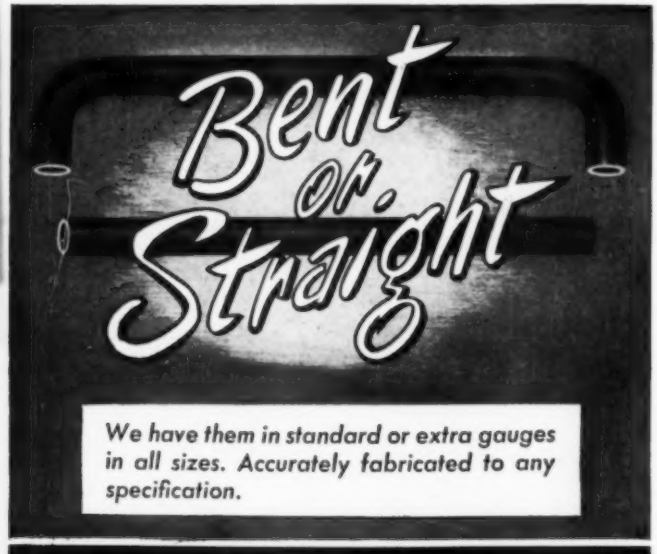
Manly Fleischmann, administrator, Defense Production Administration, heads a group of 56 speakers in the extensive discussion of plant maintenance problems scheduled for the PLANT MAINTENANCE CONFERENCE, Convention Hall, Philadelphia, Jan. 14-17.

The conference will be held in conjunction with the Plant Maintenance Show. More than 14,000 are expected to attend and 225 companies are expected to exhibit.

The conference is sponsored by the AMERICAN SOCIETY OF MECHANICAL ENGINEERS and the SOCIETY FOR THE ADVANCEMENT OF MANAGEMENT. The American Society of Lubrication Engineers conducts the panel on lubrication.

Highlight of the conference will be the division into more than 30 separate sessions in order to accommodate special talks on individual industry needs and to permit executives to discuss problems that arise in plants of varying sizes and varying maintenance needs.

Industries to be covered separately include chemical plants, metal producing, metal working, aircraft, food, glass, oil, printing, pulp and paper, textile, and woodworking.



BOILER TUBE CO. OF AMERICA
McKEES ROCKS, PA. (Pittsburgh District)
PITTSBURGH
CHICAGO
FRED S. RENAULD & CO.
LOS ANGELES

Particular problems to be discussed include maintenance of plant buildings, electrical equipment, mechanical equipment, power-plant and service equipment, and materials handling equipment.

General sessions will be on maintenance costs, project preparation, inspection methods, scheduling of maintenance work, training workers and supervisors, personnel, operating policies, safety and plant protection, housekeeping, and welding.

New Plant for SCE&G

Construction for the first two units of a new SOUTH CAROLINA ELECTRIC & GAS COMPANY steam generating plant with an ultimate capacity of 300,000 kw is scheduled to start at a site on the South Carolina side of the Savannah River four miles south of Augusta, Ga.

The plant is scheduled to begin operation with completion of the installation of the first of two 75,000 kw generators in April, 1953. The second unit will commence operations three months later.

Cost of the first two units with a capacity of 150,000 kw is estimated at $25,000,000, and the complete plant will come to about twice that amount.

Detailed designs for the new plant have been completed, the project financed, and the initial two generators are on order with the General Electric Company. Designed to burn pulverized coal it can be adapted to burn oil, if necessary.

Worthington Installation—Florida

THE SOUTHWEST WATER TREATMENT PLANT of MIAMI, FLORIDA, now under construction, has recently ordered four Diesel engine driven pumping units from WORTHINGTON PUMP AND MACHINERY CORPORATION, Harrison, N. J.

One of these engines is arranged so that it can be quickly disconnected from the pump and coupled to a 750 kva Electric Machinery generator.

The plant will supply water for Miami at an initial capacity of 40 million gallons per day. Eventual capacity will be 80 million gallons of water per day. The plant serves part of the area south of the Miami River. The plant will be completed in 1954.

De Laval Promotions

DE LAVAL STEAM TURBINE COMPANY, Trenton, N. J., has announced the following executive promotions: JAMES P. STEWART, President; WENCEL A. NEUMANN, JR., Vice President of Industrial Sales; H. G. BAUER, Vice

Carriers roll off power conveyor in finishing oven to crosstrack switches for 90° transfer to shipping area.

Carriers descend through degreasing tank on power-operated chain conveyor

Solenoid operated switch automatically brings trolleys on parallel tracks into single track alignment.

A well-known metal partition manufacturer faced the problem of increasing production without enlarging building. New and better handling methods were obviously needed. They chose an American MonoRail overhead handling system as the best answer to increase capacity without increasing space and with less handling labor. Now, this American MonoRail system handles the steel components from receipt of raw materials, through finishing to shipping. The system boosted production, cut handling labor, improved space utilization, reduced material damage, bettered working conditions, and improved production control.

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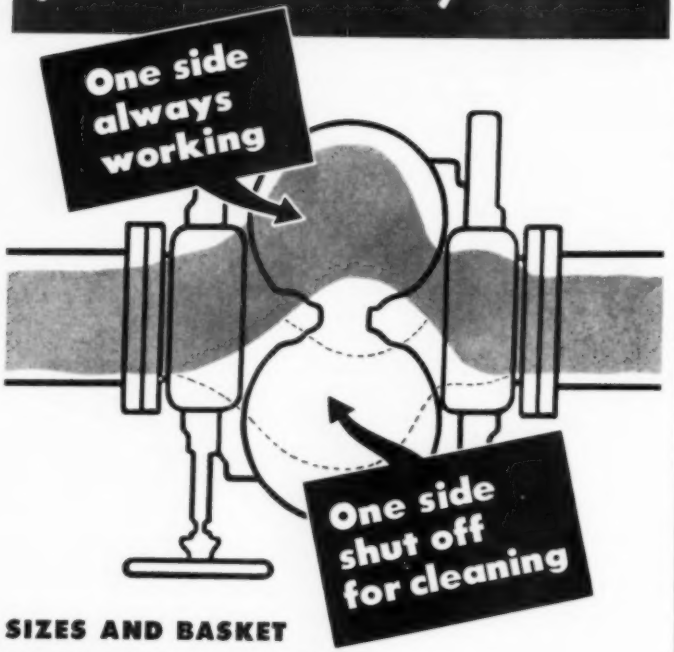

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Fourteen sizes—1" to 24". Basket perforations, 1/32" to ⅜". If finer mesh is desired, basket can be lined with wire cloth. You get the straining service you need with Twin Strainers.

There is practically never any need to shut down a Twin Strainer. It provides its own standby service, thrown into operation by the two-way valves which shut off the fouled chamber.

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A-317

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DISTRICT OFFICES IN PRINCIPAL CITIES

President of Engineering; and CHARLES A. JURGENSEN, Vice President of Manufacturing.

Mr. Stewart, a mechanical engineering graduate of Cornell University, came with the company in 1946. Prior to his election as President of the company he served as Executive Vice President. He is also President of the Hydraulic Institute, a trade association of the pump manufacturing industry.

Mr. Neuman has been associated with De Laval since 1946 and most recently as Manager of the IMO-De Laval Products Division. Previously he was with Westinghouse Corporation.

American Wheelabrator Promotions

HARRY C. MOUAT and RAY F. FRINGS of BIRMINGHAM, ALABAMA; GEORGE F. BURDITT of GREENSBORO, NORTH CAROLINA, and E. P. CLARK of HOUSTON, TEXAS, Southern representatives of AMERICAN WHEELABRATOR & EQUIPMENT CORP., Mishawaka, Indiana, have been notified of a reorganization and expansion of the sales staff at the home office.

L. L. ANDRUS is promoted to Vice President and Executive Head of the Dust & Fume Division; JOHN A. SILVER has been appointed Director of Sales; and E. B. RICH becomes General Sales Manager.

U. S. Rubber—Baton Rouge Expansion

Naugatuck Chemical division, UNITED STATES RUBBER COMPANY, has started a major expansion program at its BATON ROUGE, LA., Paracril synthetic rubber plant.

Plans call for the construction of a new administration building, laboratory, gate house as well as new reactors, drying units and other production equipment. New warehousing and latex storage facilities will also be added.

The expansion program will bring plant capacity for the production of Paracril nitrile rubber, Nitrex latex, high styrene latex and high styrene resins to approximately 30,000,000 pounds annually.

The expansion is scheduled for completion by early 1952.

American Steel Warehouse Ass'n—New Orleans

THE SOUTHERN CHAPTER of the AMERICAN STEEL WAREHOUSE ASSOCIATION met in NEW ORLEANS on October 12 and 13 at The Roosevelt.

Speakers at the luncheon session

were ROBERT S. LYNCH, President, ATLANTIC STEEL COMPANY, ATLANTA, GEORGIA, and RICHARD J. STAKELUM, General Manager of Sales, TENNESSEE COAL, IRON AND RAILROAD COMPANY, subsidiary of United States Steel Corporation.

Stakelum emphasized the importance of steel jobbers to the economy of the nation by distributing their products to a vast number of smaller users.

Lynch enumerated the many reasons why there should be a great future in the South for all makers, users and fabricators of metals, citing natural resources, growth of population, climate and a labor supply which has proved it can be readily trained in technical operations.

The American Steel Warehouse Association is composed of twenty-four chapters covering the entire United States. The Southern Chapter has forty-eight member companies. The territory covered is the States of ALABAMA, ARKANSAS, FLORIDA, GEORGIA, LOUISIANA, MISSISSIPPI, NORTH CAROLINA, SOUTH CAROLINA and TENNESSEE. GEORGE W. SMITH, of O'NEAL STEEL COMPANY, BIRMINGHAM, ALABAMA, is Chapter President.

Dresser—Dallas

Completion of the formation of a new organization known as DRESSER EQUIPMENT COMPANY is announced by H. N. MALLON, President of DRESSER INDUSTRIES, INC., DALLAS, TEXAS.

The new company is composed of two former subsidiaries: Kobe, Inc., developers and manufacturers of hydraulic oilwell pumping equipment, and International Derrick & Equipment Company, manufacturers of oilwell drilling and production equipment. These two organizations will function as divisions of the new company, itself an operating subsidiary of Dresser Industries, Inc.

Hudgens Joins Dowell—Okla.

ELLSWORTH W. HUDGENS, 1416 N. Vandalia, TULSA, has been added to the staff of DOWELL INCORPORATED as a Development Engineer specializing in cathodic protection for retarding electrolytic corrosion of pipelines, industrial equipment and other buried and submerged metals.

Hudgens, who will be located in the company's General Office in Tulsa, was formerly with the Gulf Oil Company. Previous to that he was an instructor in chemical engineering at the Missouri School of Mines, at Rolla, Missouri.

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news for the South and Southwest (continued)

Howe Scale—Atlanta

The appointment of O. B. COLLINS as Manager of the ATLANTA BRANCH was announced by THE HOWE SCALE COMPANY, Rutland, Vermont. Mr. Collins was formerly associated with the Company's Branch at HOUSTON, TEXAS.

Mr. Collins will supervise the Atlanta Branch sales and service activities for scales and hand trucks in GEORGIA, SOUTH CAROLINA, FLORIDA, ALABAMA and the southeastern portion of TENNESSEE.

The Branch is located at 685 Stewart Avenue, S. W., Building C, Unit 6, Atlanta 3, Georgia.

Iron Fireman—Atlanta

THE IRON FIREMAN CORPORATION announces the reopening of its Southern Regional office, 607 Haas-Howell building, ATLANTA, GEORGIA. Making their headquarters at this office will be E. V. CROSSIN, manager of the Southern Region for Iron Fireman, HUGH SMITH, field engineer, and J. H. MERRITT, JR., industrial sales manager for the Southern Region.

Byron Jackson—Greenville, S. C.

BYRON JACKSON CO. announces a new sales engineering and service office headed by Mr. R. S. BRIGGS, Dist. Mgr., at 115 Stokes Bldg., GREENVILLE, S. C. All of the company's activities in the South will be handled from the new office.

World's Largest Jet Plant Producing Engines only Hours Apart

Jet engines for Navy and Air Force fighter planes are coming off the final assembly line at the WESTINGHOUSE turbojet plant at KANSAS CITY, MO., only hours apart. The 85-acre plant, whose main production aisles are almost a quarter of a mile long, is the largest and most complete jet engine production facility in the world.

Primarily a production facility for the Westinghouse Aviation Gas Turbine Division at South Philadelphia, Pa., the Kansas City works, Manager S. S. STINE pointed out, is "one of the most completely integrated engine production plants in the world."

Westinghouse jets are built almost entirely of stainless steel, aluminum, and magnesium, in order to produce the combinations of strength, heat-resistance, and light weight so vital to high-performance aircraft engines.

A tour of the processing, fabricating, machining, assembly, and testing operations, Mr. Stine said, reveals that the building of jet engines "involves just about all the metal-working skills that our mass-production economy has devised."

Most material enters the plant in the form of stainless steel sheets; and stainless steel, aluminum, and magnesium castings and forgings. The plant also has extensive casting and forging facilities of its own.

Mr. Stine pointed out, however, that production of Westinghouse jets is accomplished "with the aid of a very wide-spread group of subcontractors," operating plants representing a great many different skills. These subcontractors also range "from industrial giants to virtually 'one-man' shops." Because the mass production of jet engines is so new, many of these subcontractors must be specially schooled in the production methods used and in ways to handle the new and exacting materials.

Engineering, development, design functions, and prototype production for the Westinghouse Aviation Gas Turbine Division are performed at division headquarters at the South Philadelphia works. The Kansas City plant concentrates on the quantity production of service-proved engine types.

A battery of huge concrete test cells provides the facilities for block-testing each engine as it comes off the assembly line, and to test it again after its "green run" tear-down and inspection.

Production in the huge plant is organized on the flow system, with raw materials entering by truck or freight car (the plant's roofed railroad siding accommodates 20 loaded freight cars at a time) at one end, and flowing out the other as completed engines, ready either for immediate installation in fighting planes or for shipment and storage as "spares" at forward military areas or aboard carriers of the fleet.

Multiple-processing lines—for shearing, bending, stamping, welding, machining, fitting, and sub-assembling—flank the quarter-mile-long row of production offices, tool cribs, and tool- and pattern-makers' shops down the center of the main manufacturing center. A complete forge shop for the fashioning of compressor

Ingalls can expedite the construction of your power plant because steel is fabricated in one or more of its plants and delivered to the job by the shortest route from mill of origin ready to be built into the structure. Phone, wire or write us for assistance in expediting your power plant construction problems.

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blades, and mass production facilities for the "lost wax" precision casting of turbine blades, feed their output to the final assembly section.

Tide Water Merges With CP&L

TIDE WATER POWER COMPANY, WILMINGTON, N. C., will be merged with CAROLINA POWER AND LIGHT COMPANY, according to an announcement by L. V. SUTTON, president of CP&L and WARREN W. BELL, president of Tide Water.

Under the merger, the name of Tide Water Power will be discontinued. Tide Water Power Company was chartered in 1907 and for the past several years has received most of its power from CP&L. Carolina Power was chartered in 1908. The two systems are interconnected by means of 110,000 volt transmission lines. A huge expansion and improvement program is planned for the area served by Tide Water.

Thomas Company—Charlotte

A. LYNN THOMAS COMPANY, industrial firemasonry contractors and engineers, and distributors of firebrick, refractory specialties, and industrial maintenance supplies, have opened an office and warehouse at 2900 South Boulevard, CHARLOTTE, N. C.

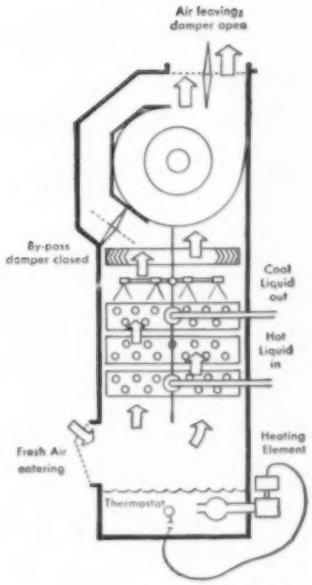
Other Thomas offices are in RICHMOND, RALEIGH and NORFOLK. The company recently was appointed distributor in the Charlotte area for A. P. GREEN FIRE BRICK COMPANY, which they have handled in the other cities for a number of years. Their sales engineers will cover NORTH CAROLINA, SOUTH CAROLINA and VIRGINIA.

Chicago Metal Hose—Memphis

The construction in MEMPHIS, TENNESSEE, of a one-story brick plant, custom designed for the fabrication of aircraft assemblies and components, has been announced by CHICAGO METAL HOSE CORPORATION, Maywood, Illinois. The plant, which when completed will total 120,000 sq ft, is being constructed by the UNION REALTY COMPANY of Memphis and will be occupied on a long term lease.

Chicago Metal Hose Corporation manufactures flexible metal hose, pipeline expansion joints, bellows and thermostats, and precision aircraft assemblies. Production equipment is scheduled to move into the plant in January with full operation contemplated by March 1st.

NIAGARA Aero Heat Exchanger



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Books for the Plant Engineer

Heating Design and Practice

By Robert H. Emerick

Published by McGraw-Hill Book Co., 327 W. 41st St., New York 18, N. Y.

453 pages

Price, $8.00

Heating Design and Practice presents the basic theories of steam, hot water and warm-air heating systems and evaluates the performance characteristics of these systems. It covers important new developments in this field, including heat pumps, baseboard radiation and panel heating systems.

Actual case histories are used to analyze heating for domestic and industrial purposes. The volume tells how to calculate heating loads, how to arrive at a satisfactory size for the heating component, and points out the advantages and disadvantages to be considered before deciding on a specific installation. Related problems such as the design of fuel handling and storage systems, the combustion characteristics of various fuels, and factors to be considered in planning incinerators, steel stacks, masonry chimneys, industrial refractories and insulation all receive detailed treatment.

Instruction is provided on how to prepare specifications for a heating system and how to analyze bids. Each topic is accompanied by a useful series of illustrations and tabulated data.

The author, Robert H. Emerick, was formerly with the Philadelphia Electric Company, and the Phoenix Engineering Corp., where he engaged in steam power plant design and in district steam heat engineering. Now a well-known consulting engineer, his varied assignments include air pollution and smoke control studies as well as heating and air conditioning design.

Metallizing Handbook

Published by Metallizing Engineer-Co., Inc., 38-14 30th St., Long Island City 1, N. Y.

250 pages

Price, $3.00

This completely new Metallizing Handbook is illustrated with photographs, diagrams and charts. It provides a comprehensive coverage of the technical as well as practical aspects of the process. Various methods of surface preparation and the application of metallized coatings for machine element work, for corrosion work, and for many special production jobs, are thoroughly detailed along with valuable supplementary information.

Equivalent Circuits of Electric Machinery

By Gabriel Kron

Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y.

278 pages

Price $10.00

"Equivalent Circuits of Electric Machinery" develops the theory of equivalent circuits without the aid of mathematics, based exclusively on a physical picture of the magnetic and electric structure of the various machines. All types of machines are treated in a unified manner by a single reasoning: first the equivalent circuit of the "primitive" machine is developed, and from this the equivalent circuits of all industrial machines are found as special cases. Emphasis is given to the calculation of the performance of several interconnected machines, not merely that of single machines.

Because of their variable-frequency feature these equivalent circuits can be used to write down the transient and accelerating equations of performance of any machine and group of machines, as well as their steady-state equations. These circuits can also be used to establish the transient or sinusoidal "transfer functions" of groups of rotating machines that are used in servo-mechanisms and in system controls.

Nomographic Charts

By C. Albert Kulmann.

Published by McGraw-Hill Book Company.

330 West 42nd St., New York 18, N. Y.

7½ x 10 inches—244 pages.

Price, $6.50.

This volume contains 92 nomographic charts for use as time-saving devices on engineering and mathematical computations. While the charts provide a means of solving a variety of functional and general problems, they are particularly useful in speeding accurate computations in such fields as hydraulics, mechanics,

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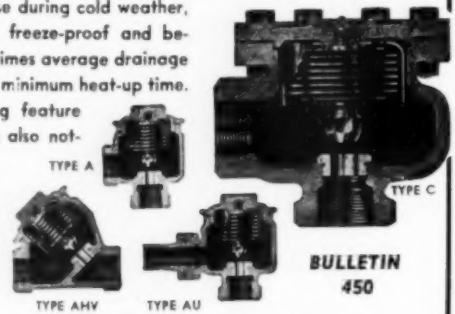

BULLETIN 450

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thermodynamics, and electric engineering.

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Fuel Oil Manual

BY PAUL F. SCHMIDT.
PUBLISHED BY THE INDUSTRIAL PRESS. 148 Lafayette St., New York 13, N. Y.

160 pages.
Price, $3.50.

"Fuel Oil Manual" is prepared for the oil user who wants to know about fuel oil selection, properties, handling, burning, troubles and remedies, together with working data for building heating, power generation and industrial processes.

Written by a chemist with many years' experience in the industry, the volume provides a working knowledge of fuel oil and how to use it. Technical language is used as little as possible, and all terms are fully explained. A chapter is devoted to each of the various important properties of fuel oil. In each case the author explains the meaning of each property, and shows how the information can be applied. Fuel oil impurities and how they affect combustion are described, and the steps which can be taken to test for or avoid impurities are discussed.

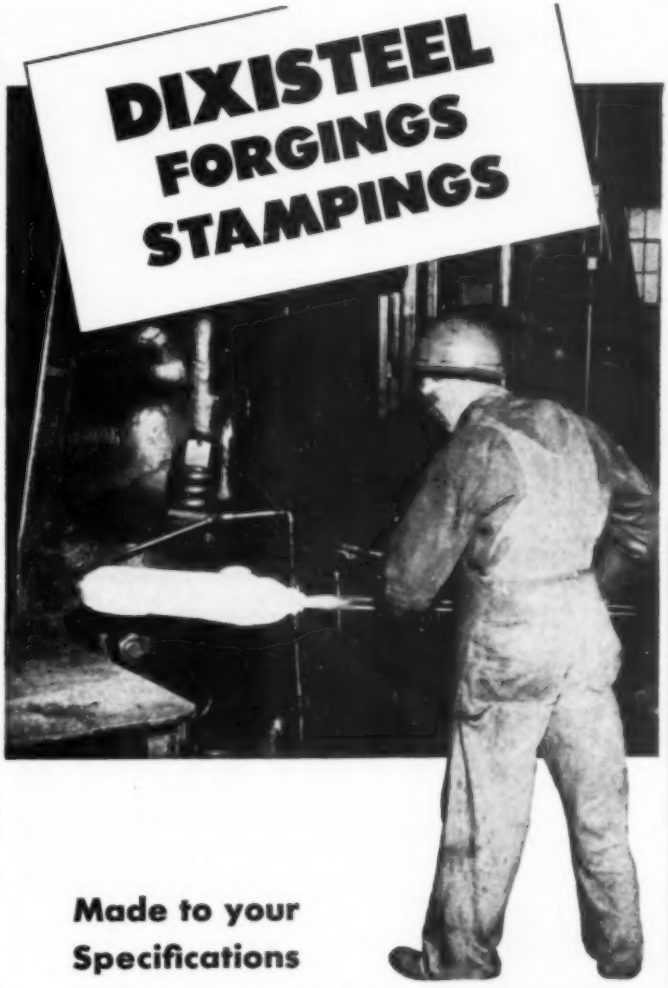
Industrial Furnaces, Volume I

BY W. TRINKS.
PUBLISHED BY JOHN WILEY & SONS, INC. 440 Fourth Ave., New York 16, N. Y.

526 pages.
Price, $10.00.

"Industrial Furnaces" lays down and discusses the basic principles underlying all furnace design and operation, provides numerous graphic illustrations and typical examples to support the text, and also offers conclusions, rather than untried theories, which have been tested and proved in actual furnace practice.

The new edition brings this treatise completely up-to-date by incorporating the most recent scientific facts which research has discovered about heat transfer and furnace design, as well as present-day design and operating principles and techniques.



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Catalogs and Bulletins

(Continued from p. 18)

Free additional information is available to readers of Southern Power & Industry. Check item number on the postage free service coupon post card—page 17.

B-10 **CONDUIT AND CABLE FITTINGS**—Bulletin No. 65, 64 pages—Lists electrical conduit fittings and cable fittings for all types of raceways including locknuts; bushings; elbows; pipe straps; conduit supports; connectors and couplings for rigid conduit, for EMT, for armored cable, for non-metallic sheathed cable and for service entrance cable; grounding equipment; service entrance fittings; floor boxes and junction boxes; tubelets; and bending tools. Illustrated.—THOMAS & BETTS CO., INC., Butler St., Elizabeth, N. J.

B-11 **REFUSE OR COAL BURNING STOKERS**—Catalog No. 505, 24 pages—"Burn Refuse or Coal, separately or in combination, Detroit Stokers" illustrates and describes the company's RotoStoker of the stationary grate type for small boilers; hand-dumping grate type for small and medium boilers; power-dumping grate type, also for small and medium boilers; and spreader stokers. Includes typical applicational photographs and engineering data.—DETROIT STOKER COMPANY, General Motors Bldg., Detroit, Mich.

B-12 **FOUR-CYCLE DIESEL**—Bulletin 191, 12 pages—Describes and illustrates the Supairthermal engine, a four-cycle Diesel, Duafuel or spark-fired gas unit with the ability to produce, in any given size, one-third more horsepower than the conventional turbocharged engine. Illustrated.—NORDBERG MANUFACTURING CO., Milwaukee 7, Wis.

B-13 **ENGINEERING SERVICES**—Catalog, 44 pages—"Organization and Services" lists types of services offered, including: engineering, design and construction supervision; special engineering studies and reports; chemical laboratory; engineering inspections and test work; management; public utility research; industrial relations; industrial research; purchasing; industrial safety; and cost and tax accounting. Installational photographs.—GILBERT ASSOCIATES, INC., 412 Washington St., Reading, Pa.

B-14 **PISTON RINGS**—Catalog 205, 12 pages—describes the new safety seal ring for diesel, gas and steam engines and compressors; discusses piston rings and operating profits; complete piston ring line described; contains operating data and engineering tables; compiled as a useful reference book for operating engineers and purchasing agents.—SAFETY SEAL PISTON RING COMPANY, P. O. Box 106, Fort Worth, Texas.

B-15 **MATERIALS HANDLING**—Catalog 205, 12 pages—Shows bulk-materials-handling applications of tractor shovels in different kinds of plants. Lists users in industries such as foundries, steel mills and metal working plants, fertilizer and chemical plants, brick, tile and ceramic plants, and coal yards. Includes job studies and performance data.—THE FRANK G. HOUGH CO., 878 Seventh St., Libertyville, Ill.

B-16 **SUBMERSIBLE PUMP**—Bulletin No. 51-5300, 4 pages—Illustrates and describes the "Subette," a small submersible pump designed for small capacities at high heads from wells of six inches inside diameter or larger. Includes engineering data.—BYRON JACKSON CO., Box 2017, Terminal Annex, Los Angeles 54, Calif.

B-17 **AIR AND GAS DIFFUSER**—Bulletin 6530, 4 pages—Illustrates and describes the Colaflex diffuser designed for fine diffusion of air or gas in sewage and industrial waste treatment; water conditioning; biological manufacturing processes; and absorption processes.—INFILCO INCORPORATED, Tucson, Ariz.

B-18 **CONVEYOR CARRIERS**—Bulletin 2-C, 20 pages—Describes carriers for belt conveyors used in bulk materials handling. Illustrated with installational photographs, equipment, and line drawings. Tables of specifications for sizes and types of conveyors are included.—STEPHENS-ADAMSON MFG. CO., Aurora, Ill.

B-19 **MAINTENANCE WELDING**—Data File—"1951 Data File of Defense and Maintenance - Conservation Welding Problems" contains over 100 pages of illustrated technical data on maintenance and repair welding problems and procedures, compiled in an effort to solve problems introduced by mounting shortages of critical materials.—EUTECTIC WELDING ALLOYS CORPORATION, Dept. "F," 40-40 172nd St., Flushing, New York, N. Y.

B-20 **DUST COLLECTION**—Catalog No. 101, 20 pages—"The Collection and Recovery of Industrial Dusts" discusses dust analysis; choice of equipment; operating characteristics of equipment; special purpose collectors; and engineering data. Illustrated with plant and equipment photographs.—BUELL ENGINEERING CO., INC., 70 Pine St., New York 5, N. Y.

B-21 **MATERIALS HANDLING EQUIPMENT**—Condensed Catalog, 8 pages—A system of visual cross reference charts makes all essential model and attachment information available at a glance. Shows specifications by model and capacity for both gas and electric fork-lifts with cushion-type tires and pneumatic tires. Includes towing tractors, powered hand trucks, hand pallet trucks, hand platform trucks, and hand stackers.—CLARK EQUIPMENT COMPANY, INDUSTRIAL TRUCK DIVISION, Battle Creek, Mich.

B-22 **AIR CONDITIONING, HANDLING, AND CLEANING**—Booklet B-5164, 16 pages—Equipment for air conditioning, air handling, and air cleaning is described and illustrated. How-it-works and how-to-use it information is in usable form. Specifications are included.—WESTINGHOUSE ELECTRIC CORP., STURTEVANT DIVISION, Hyde Park, Boston 36, Mass.

B-23 **STEAM TURBINE GENERATORS**—Bulletin 03H7634, 8 pages—Design and construction features of steam turbine generator units manufactured in NEMA ratings of 2,000 to 7,500 kw are described. Illustrated with cross section views and line drawings and diagrams.—ALLIS-CHALMERS MFG. CO., 954 S. 70th St., Milwaukee, Wis.

B-24 **STUD WELDING**—Form D-1, 8 pages—"How to Design for Nelwelding" is prepared to aid designers and production engineers in solution of fastening problems. Lists stud specifications and recommended stud selection guides; presents detailed suggestions concerning template design, provisions for accommodating fillet and includes table on minimum stud clearances applicable to portable Nelson stud welding gun.—NELSON STUD WELDING, Division of Gregory Industries, Inc., Lorain, Ohio.

B-25 **FIRE PROTECTION**—Booklet, 32 pages—"Correct Fire Protection" gives information on the right type of extinguisher for the class of fire involved, and how to use the extinguisher. Illustrates and describes the various sizes of units available for use with the different kinds of fire extinguishing agents.—AMERICAN - LaFRANCE-FOAMITE CORPORATION, Elmira, N. Y.

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Simple • Economical • Dependable

POWERS

ATLANTA, GA., 142 Spring St., N. W.

Infilco's New Headquarters Building in Tucson, Arizona

Here is the new $600,000 research and executive headquarters building of Infilco Inc. at Tucson, Arizona. Set on a seven and one-half acre plot, the new plant includes 40,000 sq ft of floor space and will house the most modern facilities for Infilco's engineering, research and development divisions, as well as the home sales and executive offices.

Arizona Diesel

(*Continued from page* 70)

button. Since the dry gases will not ignite at the engine compression of 400 psi, a small pilot charge of fuel oil is injected to ignite the gas.

An automatic pilot oil control is operated by the governor so that any shortage in the gas supply will be compensated by injection of more fuel oil. If the engine load then decreases, or if the gas supply increases beyond load requirements, oil fuel injection is reduced automatically to pilot ignition volume. If it is desired to operate any engine on less than the maximum ratio of gas, the hand operated valve in the gas supply line may be set on its graduated dial to restrict the flow of gas to the desired amount. The governor then increases oil fuel injection automatically to the required amount to carry the load. The engine may be stopped simply by moving the control lever to the "stop" position. The gas is rated at 1070 Btu/cu ft and has been supplied at approximately 19 cents per million Btu.

In anticipation of increased power requirements, additional space was provided for a sixth diesel engine with as much as 2500 kw capacity and for necessary switchgear control panels. All underground conduits and piping have been installed for the future unit, except for the cooling. Openings were provided in the building foundation for the cooling piping. The electrical system in the building is also arranged for future power requirements without further additions.

The generator control switchgear is provided with automatic synchronizing and automatic voltage regulation. The 2400 volt generator leads run underground directly to a unit type substation in the switchyard, thus providing for safe opera-

Nothing conveys an impression of quality and prestige more readily than a perfect business card designed by us.

A letter from you will bring an assortment of the business cards we have made for others.

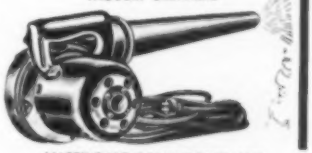
THE JOHN B. WIGGINS CO.
636 So. Federal Street, Chicago 5

WIGGINS
Peerless Book Form
CARDS

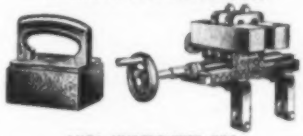
MARTINDALE
COMMSTONE HOLDERS

Hold Commstones rigid and true for concentric resurfacing of commutators and slip rings while running at normal speeds in their own bearings. Interchangeable boxes 1", 2" and 3" wide handle grinding jobs up to 4¼" wide.

BLOWERS AND VACUUM CLEANERS



MARTINDALE COMMSTONES AND COMMUTATOR GRINDING TOOLS



MICA UNDERCUTTER FOR SLOTTING COMMUTATORS

Nine Motor Driven Types

MARTINDALE PROTECTIVE MASKS

PLACE HEADBAND WELL UP AROUND HEAD TO KEEP FROM SLIPPING DOWN
PRESS NOSE TABS IN CLOSE AGAINST FACE TO HOLD PAD AGAINST THE NOSTRILS
PRESS EDGES OF FACE PLATE DOWN TO FIT FACE SNUGLY

Weight less than ½ ounce

VISIT OUR BOOTH AT THE PLANT MAINTENANCE SHOW
Philadelphia Jan. 14-17

Write for 64-page Catalog describing these and many other products for Industrial Maintenance, Safety and Production.

MARTINDALE ELECTRIC CO.
1334 Hird Ave. Cleveland 7, Ohio

New Equipment

(*Continued from Page 96*)

new riding-type truck that speeds up the movement of skid platforms and skidded cases.

The new truck is similar in design to the company's recently introduced pallet-type Low-Lift electric truck. It has a 4,000 lb capacity and will travel up to 5 mph loaded, 6 mph empty.

Raymond Low-Lift Electric Truck operates easily in limited spaces.

The truck has a patented offset drive and patented stabilizing caster arrangement. This enables it to operate easily in narrow hand truck aisles and it will turn at right angles from aisles narrower than the overall length of truck and load. As a result, it can be used in truck trailers, boxcars, elevators, and cramped production areas.

Available in three lowered heights: 6", 9" and 11". The model features a standard 4" lift. Platforms are made in two widths, 18" and 24", and are offered in standard lengths of 30", 36", 42" and 48".

The new truck is powered by the standard Raymond tractor, using a 12 volt, 400 ampere hour battery.

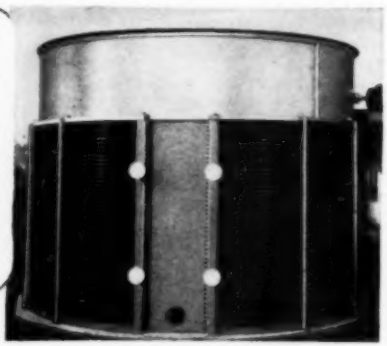
Oil Mist Precipitator

A-16 TRION, INC., 1000 Island Avenue, McKees Rocks, Pa., has developed a new oil mist precipitator to eliminate the hazardous problems caused by the fine oil mist emanating from high speed cutting and grinding machine operations.

Design of the new equipment is based upon the electrostatic precipitation principle of attraction. Oil mist from machining operations is charged as it passes through an electrostatic field and is then attracted to plates of opposite polarity from which it eventually drains into a collecting pan for ultimate reuse. Under normal operations, daily oil recovery may be as great as five gallons.

This Trion precipitator collects fine oil mist from high speed cutting and grinding machine operations.

The NEW
Pritchard Quality
QUINTAIR*
AIR COOLED HEAT EXCHANGER



For Low Cost, Dependable Cooling of Engine Jacket Water and Lubricating Oil

- Lower Installed Cost
- Higher Efficiency
- Fewer Parts to Assemble
- Lower Maintenance Costs
- Lower Operating Costs
- Many Industrial Uses

Gas & Air Treating

Specialized Heat Exchangers

Cooling Towers

Write for Bulletin No. 11.0.080

* Registered Trade Name

Products of QUALITY Specialized Process EQUIPMENT

J.F. Pritchard & Co.
EQUIPMENT DIVISION
Dept. No. 236 — 908 Grand Ave., Kansas City 6, Mo.

District Offices: CHICAGO • HOUSTON • NEW YORK • PITTSBURGH
TULSA • ST. LOUIS • Representatives in Principal Cities from Coast to Coast

industrial
OIL AND GAS BURNING EQUIPMENT

- Mechanical Atomizing Oil Burners
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- Refractory Burner and Muffle Blocks
- Industrial Gas Burners
- Low Air Pressure Oil Burners
- Fuel Oil Pump Sets
- Valves, Strainers, Furnace Windows
- Tandem Block Combustion Units
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Detailed information gladly sent you upon request.

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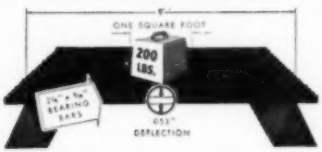
1279 East Sedgley Ave., Philadelphia 34, Pa.
Southwestern Division, 2512 So. Blvd., Houston 6, Tex.

For **STRENGTH** specify

TRI-LOK
RECTANGULAR
OPEN STEEL FLOORING



The locked-in strength of Tri-Lok enables it to stand up under heavy loads—even on long spans. Get maximum strength, air and light with minimum weight.

Tri-Lok is also available in Diagonal, or Super-Safety U-type Flooring, and in Stair Treads of all types. Write for Bulletin KN 1140.

The Tri-Lok Company is also equipped to furnish *riveted* and Tri-Forge *welded* open steel flooring. Tri-Lok can be furnished in a variety of metals, including aluminum alloy, stainless steel, etc.

DRAVO CORPORATION

National Distributor for the Tri-Lok Company
Dravo Bldg., Pittsburgh 22, Pa.
Sales Representatives in Principal Cities

tion, since the highest voltage in the building proper is 230 volts.

The building is constructed of steel framing to which pre-cast concrete panels are attached. Space is provided for plant office and a well equipped shop. A basement in front of the engines provides space for all auxiliary equipment. The building is cooled by evaporative-type coolers which maintain comfortable working conditions during the summer months. A traveling crane with electric hoist facilitates engine maintenance.

Cement Plant Power Expansion

(Continued from page 47)

is discharged at approximately 450 F.

The high temperature flue is fitted with a vertical damper near the chimney, controlled from steam pressure variations. It opens just before the boiler pops off, and closes again at a predetermined point as the pressure lowers.

Kiln — Dewey purchased one complete 250 ft kiln and one 125 ft section of another, and reassembled them into one 375 ft kiln. A Green Fuel Economizer Company induced draft fan, driven by a General Electric Company 200 hp motor and Texrope drive is employed. The fan has a capacity of 142,000 cfm at 495 rpm.

A 16 cone Buell cyclone dust collecting system was installed between the fan and kiln. Raw material is fed to the kiln from the raw feed bin by two St. Regis rotary bin feeders, operated by two Master Gearmotors. Power is synchronized with the kiln speed by a generator. Feeder speed varies directly with the kiln speed. Raw feed is pumped from the blending tank to the kiln feed bin through an 8-in. line with a 10-in. Fuller-Kinyon pump. Clinker is cooled with a Fuller cooler and accessories.

Pulverized coal is used for fuel. It is pumped to the coal storage by an 8-in. Fuller-Kinyon pump and is fed into the kiln by a Bailey coal feeder. Hot air from the cooler is utilized for secondary combustion, while a portion is pulled from the hood and tempered with atmosphere, where it is transferred through a Bailey fan and used for primary air.

The new 90 barrel per hr. kiln increases the net output of the entire plant by at least 40 per cent, because all other departments of the plant had sufficient capacity to stand this increase in the kiln output.

JEFFERSON

300 LB.
Trouble Free Unions for Tough Jobs

JEFFERSON Unions are made of Air Furnace Malleable Iron of an average tensile strength of 55,000 p.s.i., with a yield point of 36,000 pounds and an elongation of 15% in two inches.

Our seat rings are cut from seamless drawn brass tubing, free from all casting defects—sound and uniform always.

They are accurately tapped at all times; are carefully air tested and inspected before shipment, and each and every one approved only if they meet our rigid standards of inspection.

Slightly Higher Priced
But more than worth it.

See these outstanding features—

- ★ A ground ball joint to give leak-proof service
- ★ Octagonal with square corners fits any type of wrench
- ★ No gasket required, hence no maintenance problem
- ★ Hot-dip galvanized to Government Standard for corrosion resistance

Made in all thread sizes from ⅛" to 4" American Standard Taper Threads.

Also manufacture Excel 250 lbs and Master 150 lbs. All unions can be furnished with all-iron seats.

JEFFERSON UNION CO.
650 WEST 26th St., NEW YORK 1.
79 GOODING ST., LOCKPORT, N.Y.
45 FLETCHER Ave., LEXINGTON, MASS.

FRUIT STORAGE STOPS SHRINKAGE with NEW FRICK REFRIGERATING SYSTEM

Gillan Brothers maintain relative humidities of 85 per cent or higher in their 40,000-bushel apple storage at St. Thomas, Penna., even with temperatures of 32-33 deg. F! These high humidities keep the moisture where it is wanted—in the fruit.

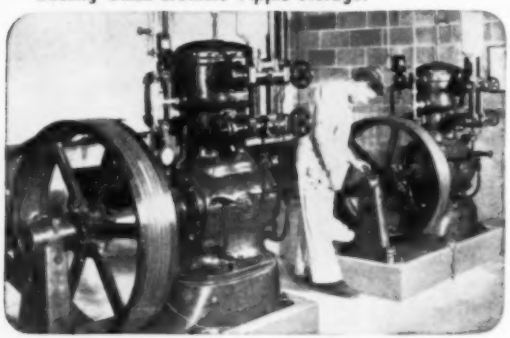
This remarkable cooling system is equally desirable for storing vegetables, nuts, hides, textiles, and other products. Covered by patent applications, the new Frick system is revolutionizing cold storage practice. Let us show you how it can save your products—and your profits.

DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA. U.S.A.

Below: Two Frick Ammonia Compressors Used for Cooling Gillan Brothers' Apple Storage.



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Deaerating Heaters
74,000#/hour
Vertical Type
with vent condenser

* * *

One Turbo-Generator Set
Complete
1250 KW at P.F. of .8
with surface condenser,
air ejector, circulating
and condensate pumps

* * *

One Circulating Pump
12,000 gpm for 25 foot
head, 580 rpm.

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Phones HOboken 3-4426 REctor 2-9361

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With headquarters in Spartanburg, S. C., or New Orleans, La., to make inspections in adjacent areas of mechanical and electrical power plant equipment; preferably engineering graduate; must have experience in operation or maintenance of power plant equipment. 25-45 years of age. Refer applications to E. M. Krinic, Mutual Boiler and Machinery Insurance Company of Boston, 508 Montgomery Bldg., Spartanburg, S. C.

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1 – 75 H.P. CHUSE STEAM ENGINE 10x10, 300 RPM, connected to Western Electric 120 amp. alternator, 40 KW, 240 volts, 3 ph., 60 cycle, also exciter and switchboard panel for generator, including voltage regulator, main switch, volt and ammeters, $2000.00. Also 1 – 4"x8" Gould's Triplex Boiler Feed Water Pump, $350.00.

SAXONY MILLS
St. Louis, Mo.

WANTED—
MECHANICAL EQUIPMENT AND MATERIALS HANDLING SALESMEN

Well established manufacturer desires two sales representatives to work out of Atlanta Regional Office. Good starting salary, plus salary and commission when established. Prefers men in late twenties or early thirties with engineering education, and some sales experience, preferably in mechanical equipment or materials handling equipment—but exceptional man who wants and can see opportunity comes first.

Apply Box 182, c/o SOUTHERN POWER & INDUSTRY, 806 Peachtree St., N.E., Atlanta 5, Ga.

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GUARANTEED MOTORS
M.G. SETS • GENERATORS
Hoists • Compressors • Transformers
Units of Every Size and Description
WE'LL SELL, BUY OR TRADE

CHICAGO *Electric Co.*

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CHICAGO 8, ILL.

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POWER PLANT FOREMAN (Shift)

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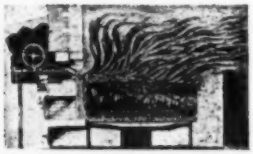
FYR-FEEDER

REG. U. S. PAT. OFF.

BURNS COAL OR WOOD LIKE OIL



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YOU CAN DO SOMETHING ABOUT IT!

REMOVE YOUR PRESENT STOKER
and "RENT" an industrial FYR-FEEDER
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AMERICAN COAL BURNER COMPANY
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IT NEVER FAILS!

The **SAFE** Relief Valve

There are
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ALL MOVING PARTS are inside housing
MANY SMALL DISCS instead of one large disc
MANY SMALL PORTS instead of one large port

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Is your guarantee of Complete Satisfaction

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- Tightening loose parts of apparatus, fixtures, tools.
- Stopping leaks in basement walls.
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SMOOTH-ON SO-300

Smooth-On Mfg. Co., Dept. 35, 570 Communipaw Ave., Jersey City 4, N. J.
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City..... *State*.....

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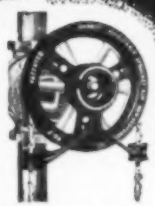

Babbitt —Adjustable— SPROCKET RIM with Chain Guide

A range of 10 ADJUSTABLE sizes fits all valve wheels with rising or non-rising stems, from 2 to 30 inches in diameter.

PREVENTS ACCIDENTS! No more climbing to operate overhead valves.

PREVENTS WASTE! Positive control, immediate response.

EASY CONTROL! Easier than direct manual operation.

SAVES MONEY! Avoids accidents, permits piping short-cuts; saves piping costs.

ADJUSTABLE . . . fits all valve wheels

CUTS COSTS . . . simplifies pipe layouts

CUTS ACCIDENTS . . eliminates climbing

Here's easy, convenient, instant control of overhead, out-of-reach valves—right from the floor! Four simple, quickly-assembled parts and the valve handwheel is ready to operate.

Jenkins Brothers, Atlanta, has complete stock. Other distributors in principal cities. Or send for Catalog Folder SP-2.

BABBITT STEAM SPECIALTY CO.

1 Babbitt Square, New Bedford, Massachusetts

Avoid Plant Shut-Downs Due to Gas Failure!

Install a Pritchard LP-Gas Standby Plant.

Wintertime gas supply failures need no longer be a threat to the uninterrupted operation of your plant. Now you can be sure of continuous operation and production during emergency periods with a Pritchard LP-Gas Standby Plant.

There is no need to switch over to a more costly year-round fuel either! A Pritchard LP-Gas Standby Plant uses *low-cost* liquefied petroleum gas and can be easily turned on in a matter of minutes without extra burner equipment or adjustments. Fuel can be delivered by rail or truck at any time and stored for future emergency use. Butane or propane-butane gas mixtures can be used interchangeably.

Don't let the bogey of gas supply failure cause unnecessary shut-downs of your plant! Let Pritchard's experienced gas engineers give you an estimate on a Pritchard LP-Gas Standby Plant engineered to your specific requirements. Your inquiry invited.

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magno-tronic

DUAL SILVER POINT — FULLY AUTOMATIC

FLUORESCENT STARTERS

—completely eliminate annoying blinking and flickering of dead fluorescent lamps!

REFLECTS THE CRAFTSMANS SKILL

GUARANTEED — FOR ONE YEAR!

This is a glow switch condenserless precision starter equipped with automatic thermal relay circuit breaker. The relay automatically removes the lamp from the circuit electrically when the lamp becomes deactivated and automatically resets upon interruption of the lamp circuit.

SIMPLIFIES — Replacement of defective lamp automatically recycles starter circuit. No buttons to push — no replacement of starter.

REDUCES COST — Magno-Tronic starters provide exact timing of electrode heating, preventing excessive loss of emission material, thus assuring maximum lamp life.

VERSATILE — Built to operate efficiently over an extended voltage and temperature range with absolute dependability.

SP-15-20 For use with 15 or 20 watt lamps.

SP-30-40 For use with 30 or 40 watt lamps.

SP-85-100 For use with 100 watt lamps.

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A PLASTIC LINING USED IN PLACE OF FIRE BRICK

LONGER LASTING BOILER FURNACES

Boiler furnaces lined with CARECO last two to four times longer than those lined with fire brick. Write for quotation.

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(Basic Principles of Steam Plant Practice)

By A. D. HOLLAND

Assoc. Prof. of Mech. Engr., Georgia School of Technology

"Fundamentals of Boiler Plant Engineering"—is different from most handbooks in that it goes into the fundamental principles of boiler plant operation. It is written so that it can be studied by those who have not had an opportunity to learn these basic laws; at the same time its many charts, tables and formulae make it a valuable reference book for the trained engineer.

The basic principles covered in this book have such wide application that it will be extremely helpful to refrigeration, air conditioning, textile and hydraulic engineers and master mechanics. Stiff cover, cloth binding, 4½ x 7 inches, 232 pages, 37 tables, 55 illustrations, 30 memorandum pages for your special notations. "FUNDAMENTALS OF BOILER PLANT ENGINEERING" may be secured with a 3-year subscription to SOUTHERN POWER & INDUSTRY for $3.00.

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JENKINS PRACTICAL PIPING LAYOUTS

57

How to plan

CONNECTIONS FOR COMMONLY USED TYPES OF METERS

In practically all industries meters are used to compute, accurately and automatically, the amount of flow. Fluids measured may be liquid, gas, or vapor (water, oil, gasoline, fuel gas, steam). Diagrams show the basic piping hookups for some of the more commonly used meters.

Orifice Type — generally used to indicate, totalize, and record moderate quantities of liquids, gases, or vapors.

Venturi Type — also indicates, totalizes and records. It is frequently used on condenser water supply units in power stations, water pumping stations, and sewage plants.

Area Flow Type — or Rotameter is for indicating, principally, in lines carrying fluids in moderate quantities.

Displacement Meter — usually totalizes only; this is the type used to measure water supply from city mains to buildings.

Valve recommendations include bronze, for ordinary service, and stainless steel where corrosive liquids are handled. Jenkins Fig. 106-A Bronze Globe is especially suited for shut-off service as recommended in these hookups. Jenkins All-Iron Valves are also available where desired.

Consultation with meter manufacturers is recommended to determine the type best suited for your particular service.

A CHOICE OF OVER 500 VALVES

To save time, to simplify planning, to get all the advantages of Jenkins specialized valve engineering, select all the valves you need from the Jenkins Catalog. It's your best assurance of *lowest cost in the long run*. Jenkins Bros., 100 Park Ave., New York 17; Jenkins Bros., Ltd., Montreal.

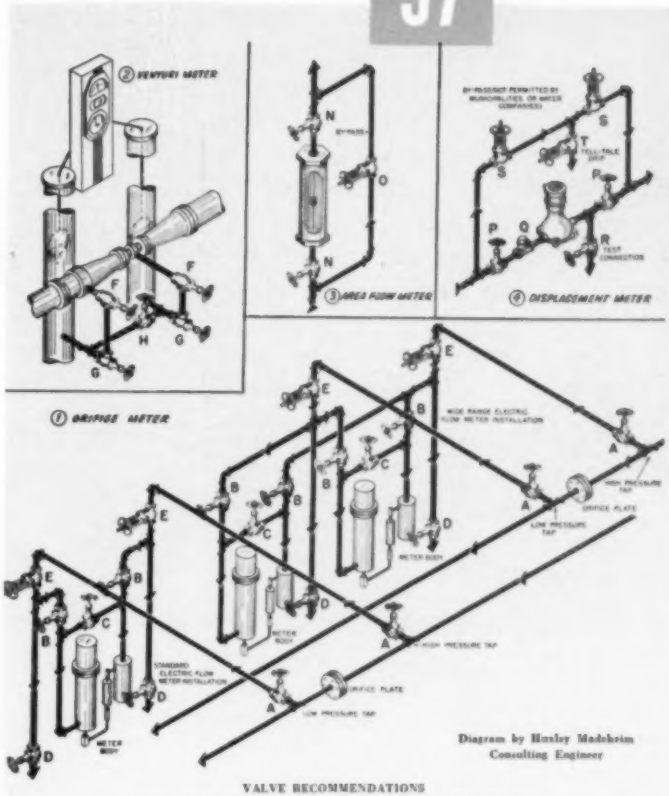

Diagram by Hanley Madelheim
Consulting Engineer

VALVE RECOMMENDATIONS

For details of valves to suit varying conditions see Jenkins Catalog.

JENKINS VALVES						
	Code	Quan.	Bronze	Stainless		Service
ORIFICE METER	A	4	106-A	1308	Globe	Orifice Tap Shutoff
	B	6	106-A	1308	Globe	Meter Body Shutoff
	C	3	741-G	1308	Globe	Equalizing Line
	D	4	106-A	1308	Globe	Drain & Blow Down
	E	4	47-U	1302	Gate	Main Shutoff or Meter
VENTURI METER	F	2	108-A	1310	Angle	Piezometer Tap Shutoff
	G	2	108-A	1310	Angle	Tap Shutoff to Water Cock
	H	1	741-G	1308	Globe	Equalizer
AREA FLOW METER	N	2	106-A	1308	Globe	Meter Shutoff
	O	1	47-U	1302	Gate	By-Pass
DISPLACEMENT METER	P	2	47-U	1302	Gate	Meter Shutoff
	Q	1	92	1328	Check	Anti Back Flow
	R	1	106-A	1308	Globe	Test Connection
	S	2	47-U	1302	Gate	By-Pass
	T	1	47-U	1302	Gate	Tell Tale Drip

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JENKINS
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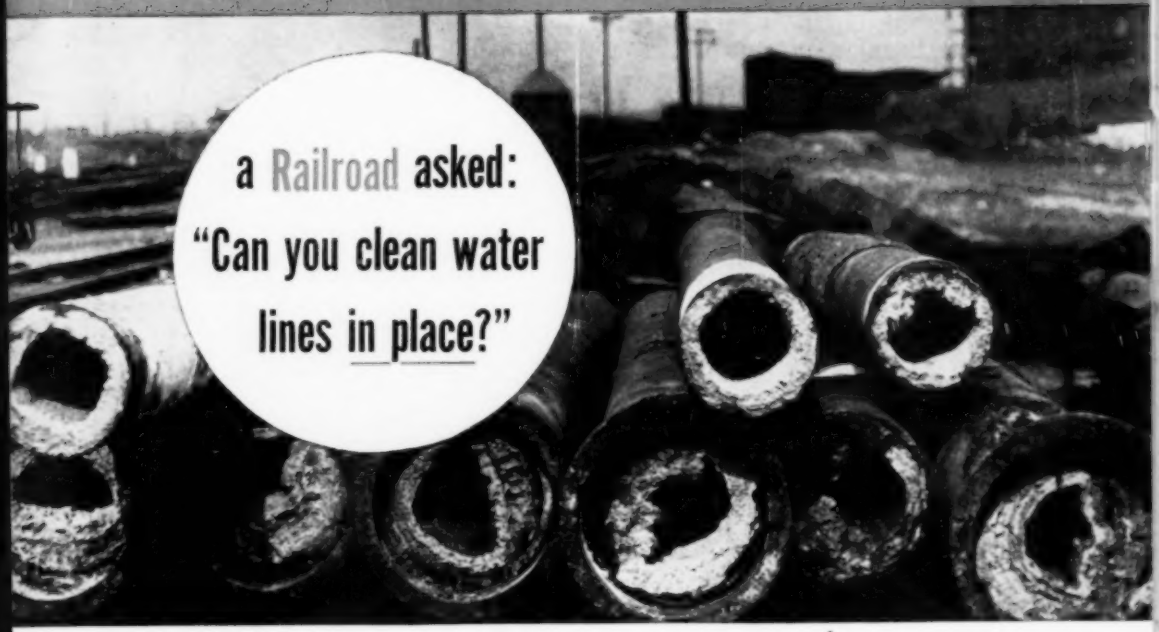
VALVES
SINCE 1864
TRADE JENKINS MARK

COMPLETE DESCRIPTION AND ENLARGED DIAGRAM OF THIS LAYOUT FREE ON REQUEST. Includes additional detailed information. Simply ask for Piping Layout No. 57.

DOWELL SERVICE

CHEMISTRY APPLIED TO MAINTENANCE CLEANING PROBLEMS



Dowell Service cleaned over 8600 feet of buried water line in six days!

You don't have to dig up water lines in order to clean them! Take the case of a major railroad that had over 8600 feet of *buried* water lines, ranging from 2 to 12 inches in diameter. The capacity of these lines had been greatly reduced by scale deposits. Dowell Service cleaned all the lines, *in place*, in only six days with a minimum interruption in service.

Dowell Service offers *fast*, effective cleaning of pipelines—underground or above, indoors or out. No digging or dismantling is necessary. Dowell liquid solvents, designed to dissolve the accumulated deposits, are introduced through regular connections. Because they are liquid, Dowell solvents reach wherever steam or water flow, cleaning places inaccessible to other methods—angles, curves, valves, complicated surfaces and hook-ups. *Experienced* Dowell engineers do the job, using Dowell-designed, truck-mounted pumps, mixers and control equipment.

Many other types of equipment can also be cleaned efficiently, economically by Dowell Service. If you have boilers, condensers, evaporators, bubble towers, water wells or other operating equipment where deposits are reducing capacity, let *Dowell Service save you time and money* in maintenance cleaning!

Other recent Dowell jobs:

Water well cleaned for large utility. Original production of 1150 gpm had dropped to 550 gpm. Dowell Service brought production back to 1100 gpm.

Boiler cleaned for steel company. Steam production before Dowell Service: 115,000 p.p.h.; steam production after Dowell Service: 145,000 p.p.h.

Air cooling system on two 22,500 K.W. generators cleaned for Midwestern Utility company in four hours. Before Dowell Service, the operating temperature of the generator was at the maximum allowable of 60° C. After service, the temperature was a normal 50° C.

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★ *Maintenance cleaning service for industrial heat exchange equipment.*

★ *Chemical services for oil, gas and water wells.*

★ *Magnesium anodes for corrosion control.*

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